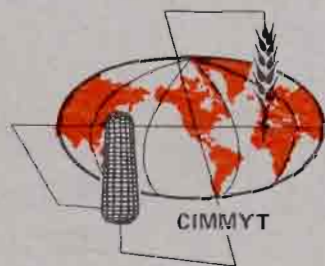


WHEAT PRODUCING REGIONS
IN DEVELOPING COUNTRIES



CENTRO INTERNACIONAL DE MEJORAMIENTO DE MAIZ Y TRIGO

INTERNATIONAL MAIZE AND WHEAT IMPROVEMENT CENTER

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WHEAT PRODUCING REGIONS
IN DEVELOPING COUNTRIES

CIMMYT - JULY 1985

PREFACE

The following maps and data relate to 22 of the 25 developing countries which produce over 100,000 has. of wheat. They are based on contributions by national programs and CIMMYT staff and are the result of a series of exchanges as impressions about wheat regions were blended and improved over time.

The materials have a long genesis. More than a decade ago Drs. Tony Fischer, Peter Goldsworthy, and I agreed on the advantages of a description of the agro-climatic regions in which farmers grow maize and wheat. We hoped to build these on the insights of agro-climatologists and physiologists. This proved to be difficult.

In 1977 Norman Borlaug and I asked national program wheat workers to give us their impressions of wheat regions and major problems confronting wheat breeders. After several exchanges and several years returns available from most countries provided a point of departure for refinement. In 1982 Dr. Byrd Curtis and I asked colleagues in national programs to help us improve on the earlier data. What appears here represents several added rounds of exchange following on the 1982 request. Through all of this CIMMYT wheat program staff, especially those in outreach, have contributed insights to the evolving delinations.

While these data have been through several iterations, they should still only be seen as good approximations. Indeed one of the purposes in presenting the data is to broaden the efforts towards precision, as ever larger numbers of wheat workers contribute their impressions. In the near future we will improve the taxonomy describing losses to disease. As well, we will add details related to the economic circumstances of farmers and the role of wheat for each of the regions described.

Even as they stand, the tables and maps will serve many purposes. For CIMMYT they will add an empirical dimension to our understanding of the relative importance of the diverse needs of the national programs. Taken together with the locations of testing stations, the regions offer a revealing, alternative way to aggregate the results of international nurseries. As well, the descriptions--especially those related to moisture conditions and maturity requirements--offer an alternative way to target specialized nurseries. For colleagues in national programs the data can become an element in shaping breeding priorities. This is not to suggest that wheat specialists have not long had a

good sense of the priorities which motivate their work--they have had. Writing it down, however, and refining the details will serve to sharpen that sense. Finally, with careful concern for descriptors, those concerned with a particular region in one country can identify rough analogues in other countries for direct exchange of data, ideas, and material; adding new linkages to the already dynamic international wheat network.

To those who have given so much of their time over the years, a thousand thanks. Now, with this behind us, it can all be made better. We look forward to receiving suggestions for improvements.

Donald L. Winkelmann,
CIMMYT, May 1985.

GLOSSARY

REGION:

Numbers at column heads in tables refer to numbers on accompanying map.

TYPE:

SB	=	spring bread	WD	=	winter durum
SD	=	spring durum	F	=	facultative
WW	=	winter bread			

AREA:

In 1000's of hectares. For the most part, regions with under 25,000 has. are not included. While the areas reported are not highly precise, they are good opportunities.

MATURITY:

E	=	early	ME	=	between E and I
I	=	intermediate		=	standardized variety Siete Cerros
L	=	late	ML	=	between I and L

MOISTURE CODE:

A	=	rarely stressed	C	=	frequently stressed
B	=	sometimes stressed	D	=	usually under some stress

DISEASE/INSECTS:

The numbers are an estimate of annual average percent losses over the past ten years over the entire region. A "P" means disease is present but not currently causing losses, except in the case of China where the "P" means present but without saying anything about losses. For China, numbers in parenthesis indicate rank order of significance of disease within a region. "T" means a trace.

Stations identified are those which have participated actively, now or in the past, in international wheat networks or which are important to national research efforts. Station names are associated with dots on the map according to the rule: northern most are listed first, left most are first when latitudes roughly the same.

ARGENTINA I

Region	1	2	3	4	5
Type	SB	SB	SB	SB	SB
Area (1000's ha)	375	875	825	325	425
Maturity	I	I	I	I	I
Moisture Code	C	B	A	A	A
Cold Tolerance					Y
Drought	Y	Y			Y
Heat	Y	Y			
Diseases/Insects (% loss):					
Leaf Rust	1	2	3	3	1
Stem Rust	P	P	P	P	P
Stripe Rust					1
Septoria (T)	1	2	3	3	3
Root Rots					P
Bunt					
Loose Smut	1	2	2	2	P
Fusarium G.	2	2	2	3	2
Aphids					

Region 2. Late heat, sometimes dry at flowering.

ARGENTINA II

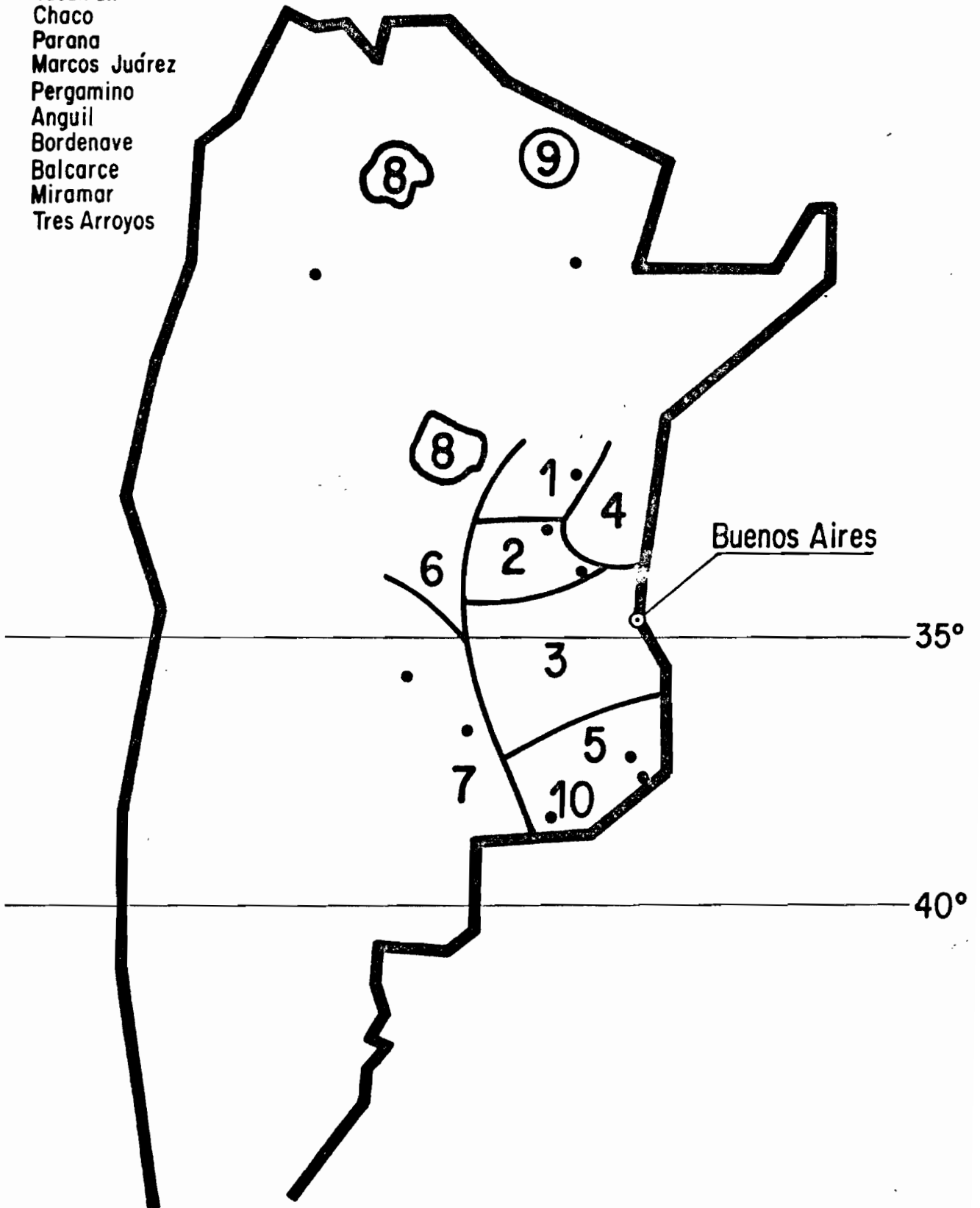
Region	6	7	8	9	10
Type	SB	SB	SB	SB	SD
Area (1000's ha)	300	2,400	50	65	300
Maturity	I	L	I	I/L	I
Moisture Code	C	D	A	C	A
Cold Tolerance		Y			
Drought	Y	Y		Y	
Heat	Y		Y	Y	
Diseases/Insects (°/o loss):					
Leaf Rust	I	P	P	2	1
Stem Rust	P			1	1
Septoria (T)	1			2	1
Root Rots					P
Bunt					
Loose Smut	1			1	
Fusarium G.	1			2	5
Helminthosporium				P	
Aphids	1	3			

Region 6. Late heat.

Region 9. Both I and L are grown, depending on planting dates.

Argentina

Tucuman
Chaco
Parana
Marcos Juárez
Pergamino
Anguil
Bordenave
Balcarce
Miramar
Tres Arroyos



BRAZIL

Region	1	2	3
Type	SB	SB	SB
Area (1000's ha)	700	980	20
Maturity	I	I	I
Moisture Code	A	C	B
Shattering	Y	Y	
Aluminum Soils	Y	Y	
Diseases/Insects (% loss):			
Helm. S	15	6	4
Leaf Rust	15	3	4
Stem Rust	8	1	3
Fusarium	10	2	1
Septoria (N)	11		
Root Rot	7		
Ophiobolus	15		
Soil Born Mosaic	15		

Losses in Regions 2 and 3 are in spite of heavy applications of fungicides. Fungicides are also used in Region 1. (Region 1 losses appear to be overstated as they imply a 96 percent loss to disease in the average year.)

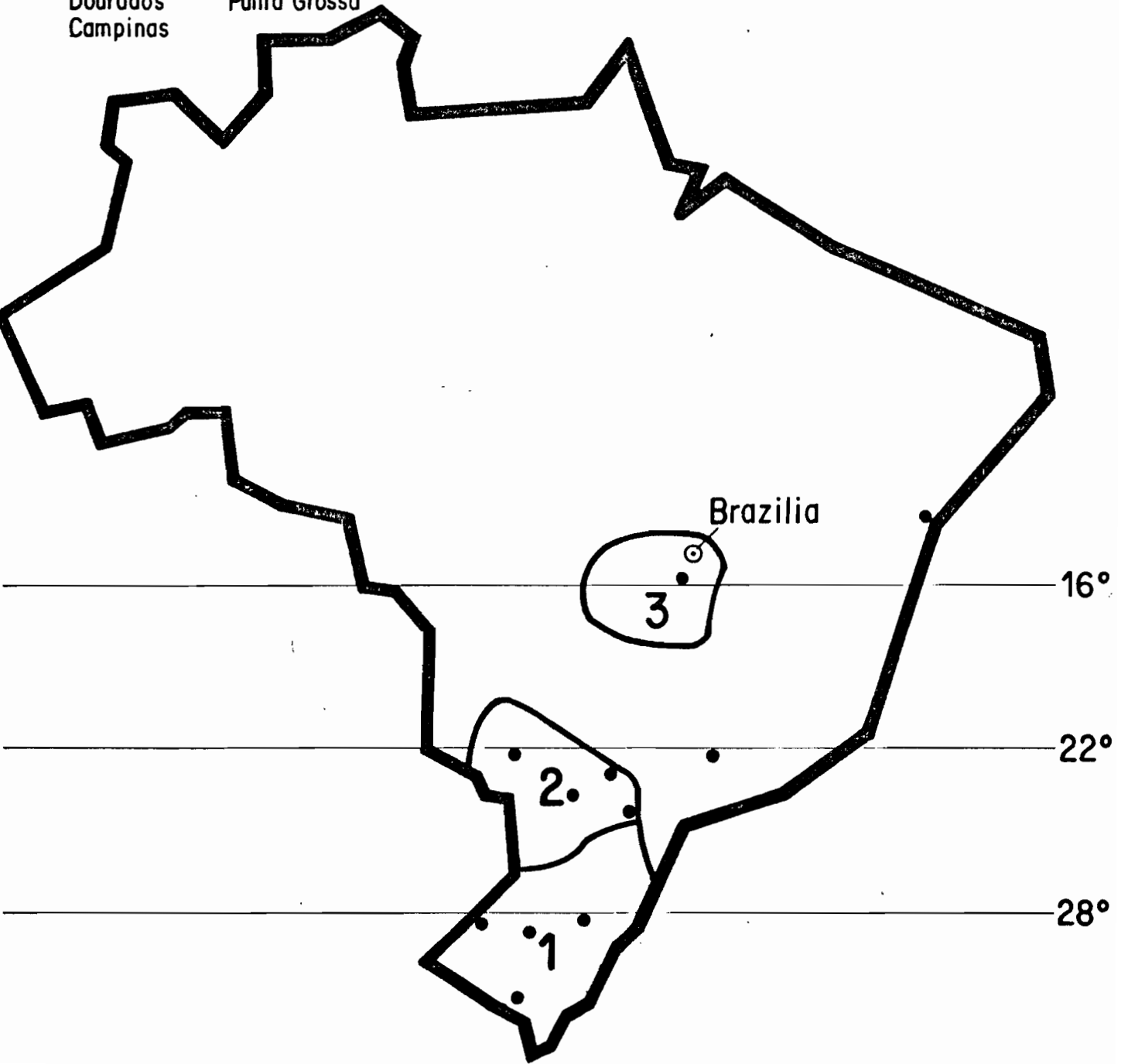
Brazil

Salvador
Brazilia
Dourados
Campinas

Londrina
Cascavel
Punta Grossa

Passo Fundo
Sao Borja

Cruz Alta
Bage



CHILE I

Region	1	2	3	4A	4B	4C
Type	SB	SB	SB	SB	WW	F
Area (1000's ha)	90	45	45	35	35	35
Maturity	E/I	I/L	I	E/I	E/I	E/I
Moisture Code	A	C	B	C	C	C
Cold Tolerance		Y		Y	Y	Y
Shattering						
Diseases/Inputs (% loss):						
Stem Rust	2					
Leaf Rust	T		I	I	I	I
Stripe Rust	2	1	4	4	4	4
BYDV	5		3	2	2	2
Root Rots	3	3	5	3	3	3
Septoria (T)		8	3	7	7	7
Aphids	2		T			

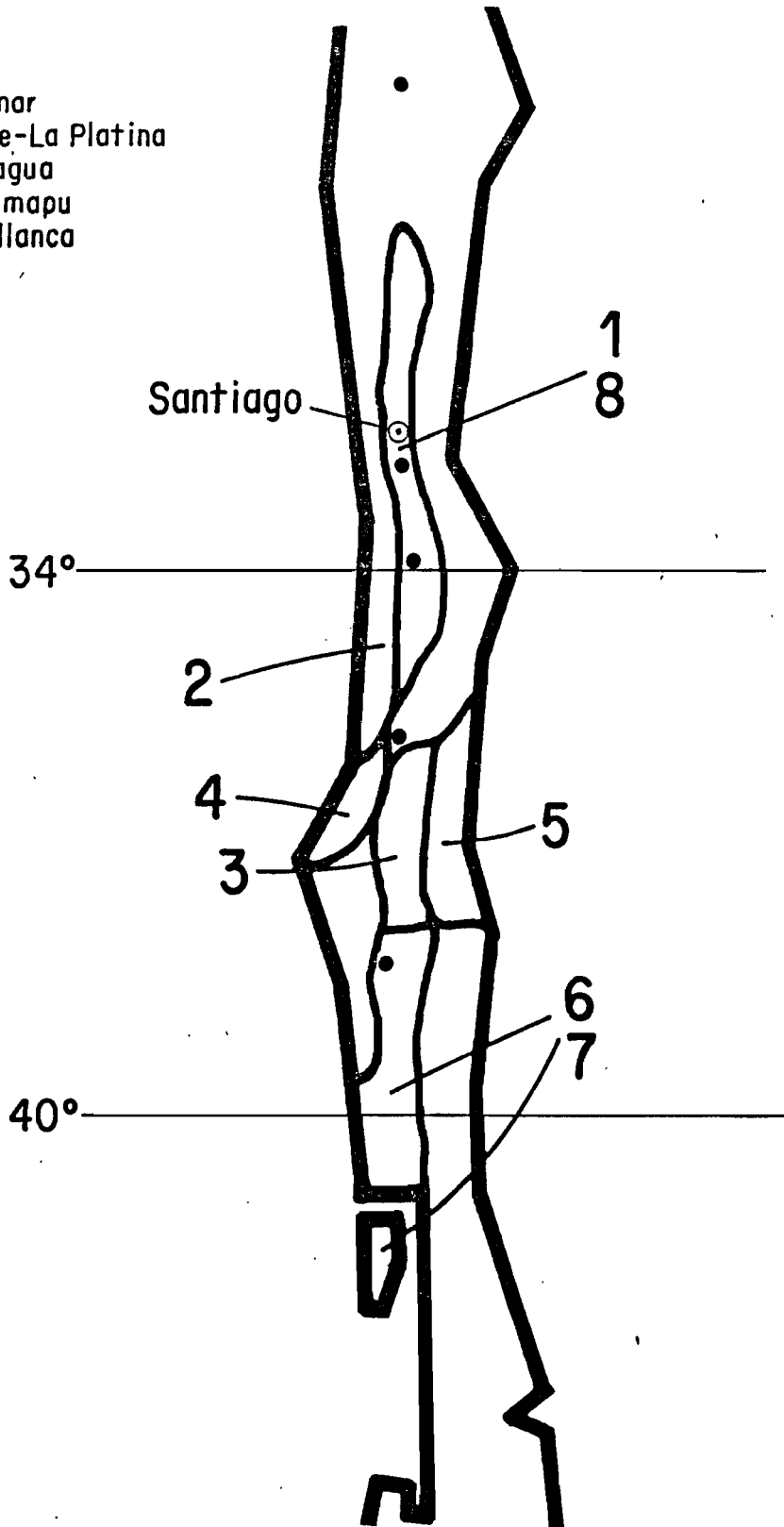
In several regions two maturity classes are grown. Which is sown depends on planting dates.

CHILE II

Region	5A	5B	6	7A	7B	8
Type	WW	F	SB	WW	F	SD
Area (1000's ha)	40	40	80	80	80	10
Maturity	E/I	E/I	L	E/I	E/I	I
Moisture Code	B	B	B	B	B	C
Cold Tolerance	Y	Y	Y	Y	Y	
Shattering			Y			
Diseases/Insects (°/o loss):						
Stem Rust						2
Leaf Rust			1	1	1	
Stripe Rust	3	3	3	7	7	1
BYDV			1	1	1	11
Root Rots	5	5	3	5	5	4
Septoria (T)	3	3	3	4	4	

Chile

Vallenar
Pirque-La Platina
Rancagua
Quilamapu
Carrillanca



MEXICO

Region	1	2	3	4	5	6
Type	SB	SB	SB	SB	SB	SD
Area (1000's ha)	150	280	100	50	50	120
Maturity	I	I	I	I	E	I
Moisture Code	A	A	A	B	D	A
Drought					Yes	
Acid Soils				Yes		
Diseases/Insects (% loss):						
Leaf Rust		5	7	5	5	P
Stem Rust	P	P	P	P	P	P
Stripe Rust			2	7	T	
Septoria (T)				7		
Fusarium				5		
BYDV				3		
Loose Smut	P	P	P	P	P	
Aphids	3	3	3	3	3	3

- Areas:
1. N. Sonora (Hermosillo, Caborca) Delicias, Chih., B.C. Sur, B.C. Norte.
 2. Yaqui, Mayo, Mochis, Culiacan, Carrizo.
 3. El Bajio.
 4. Highlands, Rainfall + 500 m. (Jalisco, Michoacan, parts of Mexico).
 5. Highlands, Rainfall - 500 m. (Durango, Zacatecas, parts of Mexico, Puebla, St. Luis Potosi, Pachuca-Huamantla Region; Ensenada in B.C. Norte).

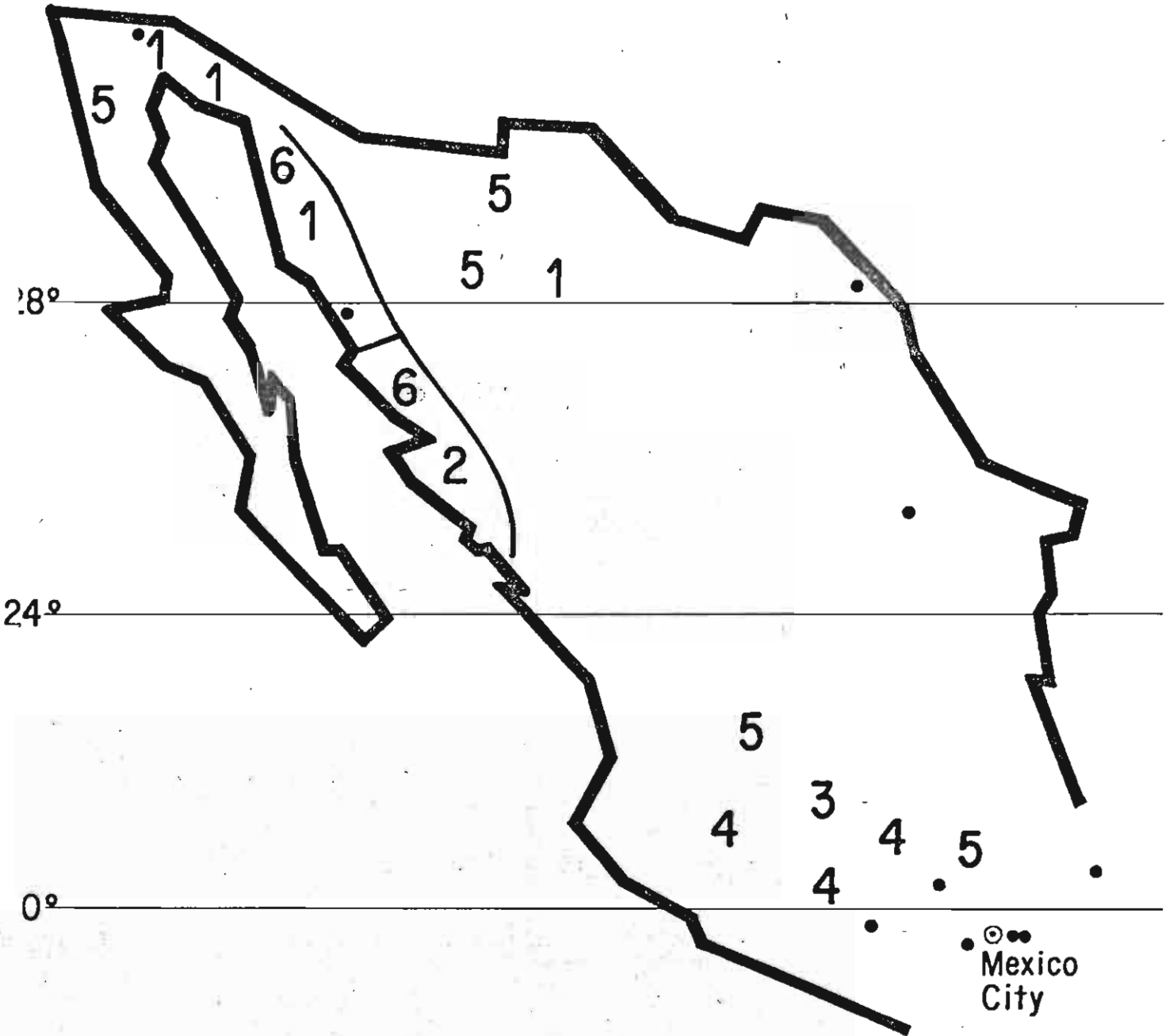
Weeds are perhaps major single problem restricting yields.

Mexico

Mexicali
Coahuila (Zaragoza)
Sonora (CIANO)
Nuevo Leon (Apodaca)

Poza Rica
El Bajío (CIAB)
Patzcuaro

Chapingo
El Batán
Toluca



PERU

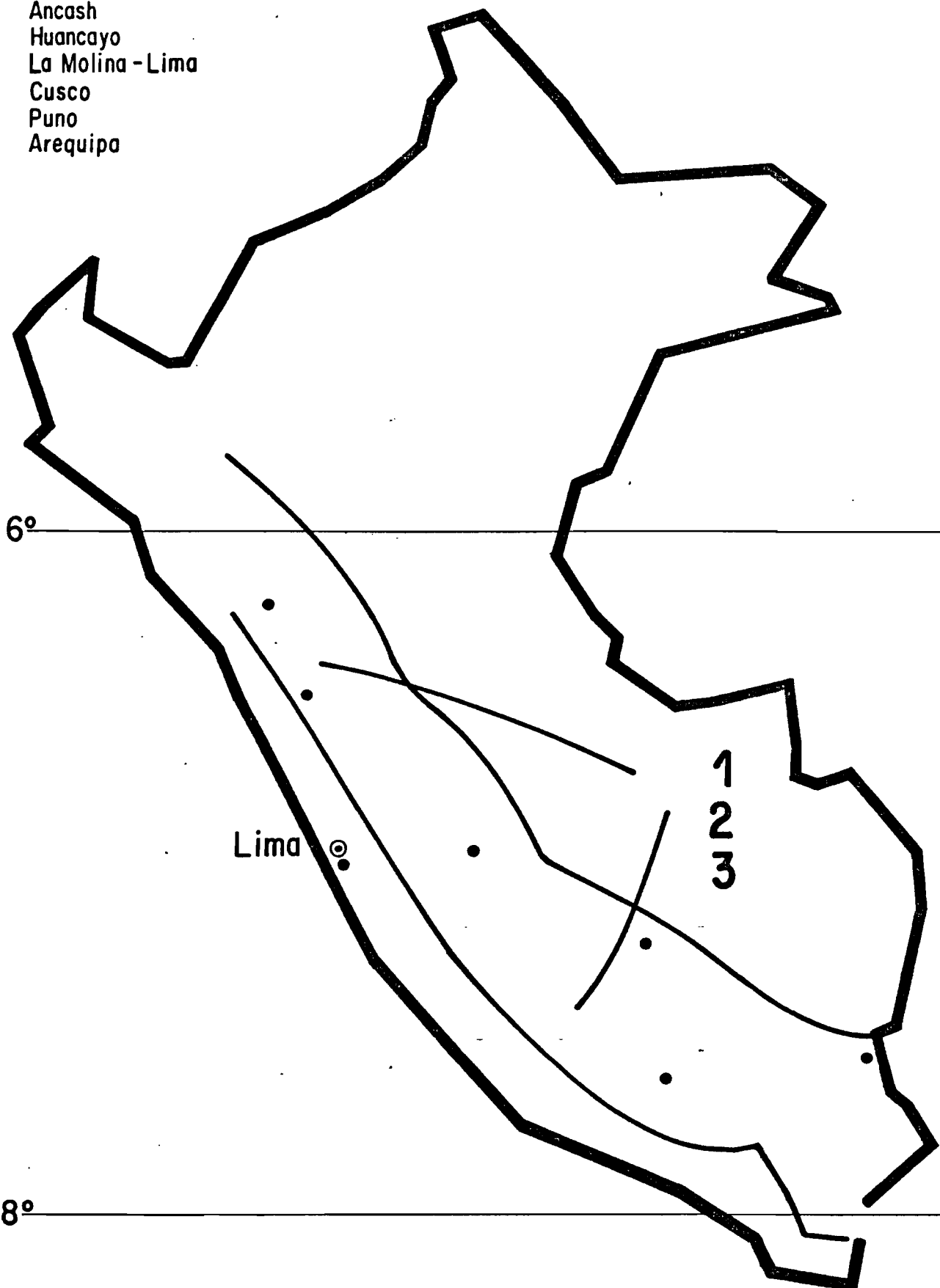
Region	1ⁱ	2ⁱ	3
Type	SB	SB	SDⁱⁱ
Area (1000's ha)	20	40	40
Maturity	E	E	E
Moisture Code	A	B	B
Cold Tolerance	Yes	Yes	Yes
Diseases/Insects (°/o loss):			
Stem Rust	2	2	3
Stripe Rust	10	3	6
Leaf Rust	2	2	2
BYDV	3	3	3

i/Region 1, 2 = Interspersed throughout highlands.

ii/ Large kernel disereable for regional dishes.

Peru

Cajamarca
Ancash
Huancayo
La Molina - Lima
Cusco
Puno
Arequipa



URUGUAY

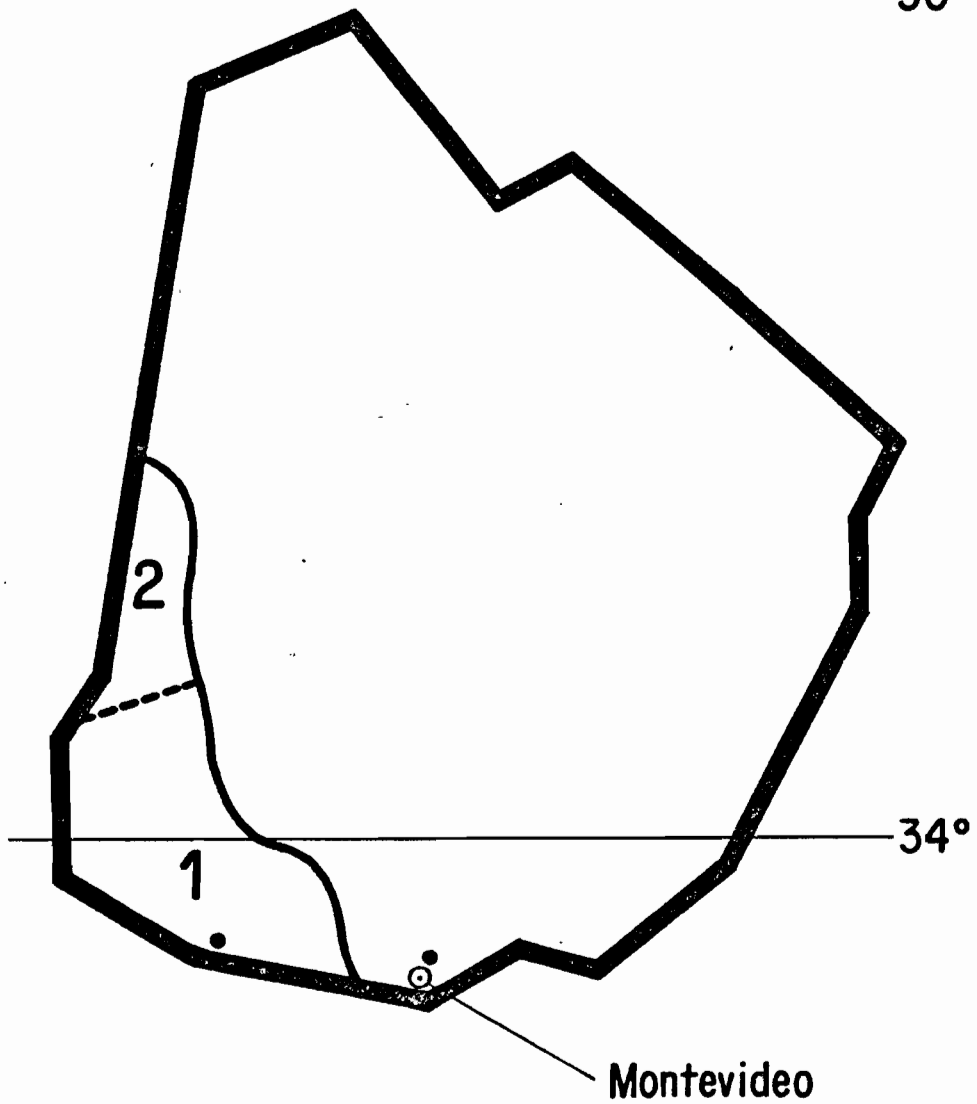
Region	1	2
Type	SB	SB
Area (1000's ha)	150	60
Maturity	I/L	I
Moisture Code	B	B
Diseases/Insects (% loss):		
Septoria (T)	7	
Fusarium (G)	4	7
Leaf Rust	1	2
Stem Rust	1	2
Septoria (N)		2

Uruguay

La Estanzuela
Montevideo

Bread

30°



ALGERIA

Region ⁱ	1	2	3	4	5	6
Type	SD	SD	SB ⁱⁱ	SB	SB	SB ⁱⁱ
Area (1000's ha)	270	715	385	100	460	220
Maturity	I	I	ML ⁱⁱⁱ	I	I	ML ⁱⁱⁱ
Moisture Code	B	C	D	B	C	D
Cold Tolerance			Yes			Yes
Shattering	Yes	Yes	Yes	Yes	Yes	Yes
Diseases/Insects (% loss):						
Septoria	6			6		
Leaf Rust	5	2		5	2	
Stem Rust	T	T		T	T	
Stripe Rust	3	5	3	3	5	3
Tan Spot	1			1		
Root Rot		6	7		6	
Bunt		3	3		3	3
Hessian Fly		2	4		2	4
Saw Fly		P	1		P	1

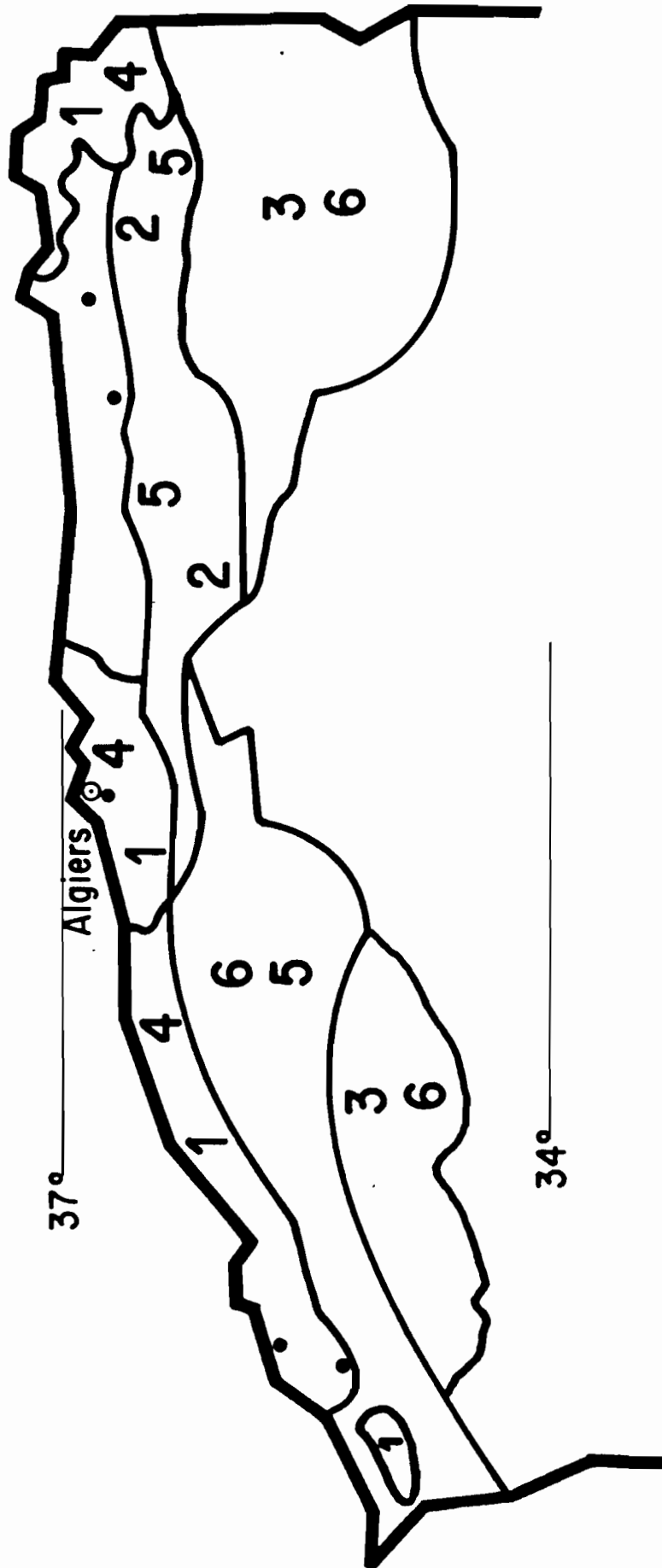
ⁱ/Regions 1, 4 = Littoral
 2, 5 = Sub-littoral
 3, 6 = High Plateau

ⁱⁱ/Good cold tolerance.

ⁱⁱⁱ/Siete Cerros plus ten days.

Algeria

- Alger
- Constantine
- Setif
- Oran
- Sidi Bel-Abbes



EGYPT

Region ⁱ	1	2	3	4	5
Type	SB	SB	SB	SB	D
Area (1000's ha)	125	120	110	170	30
Maturity ⁱⁱ	E	E	E	E	I
Moisture Code	A	A	A	A	A
Heat				Yes	Yes
Salinity	Yes				
Shattering			Yes	Yes	
Diseases/Insects (% loss):					
Stripe Rust	1	1			
Stem Rust	1	2			
Leaf Rust	2	2	1		
BYDV	T				
Bunt (T)				P	P
Smut (L)				P	P
Smut (C)				P	P
Aphids			5	7	P

^{i/}Region 1 = North Delta

2 = South Delta

3 = Middle Egypt (Fayoum, Beni Suef, Minia)

4 = Upper Egypt (Assuit, Sohag, Queda, Aswan)

5 = Upper Egypt (Assuit, Sohag, Quena, Aswan)

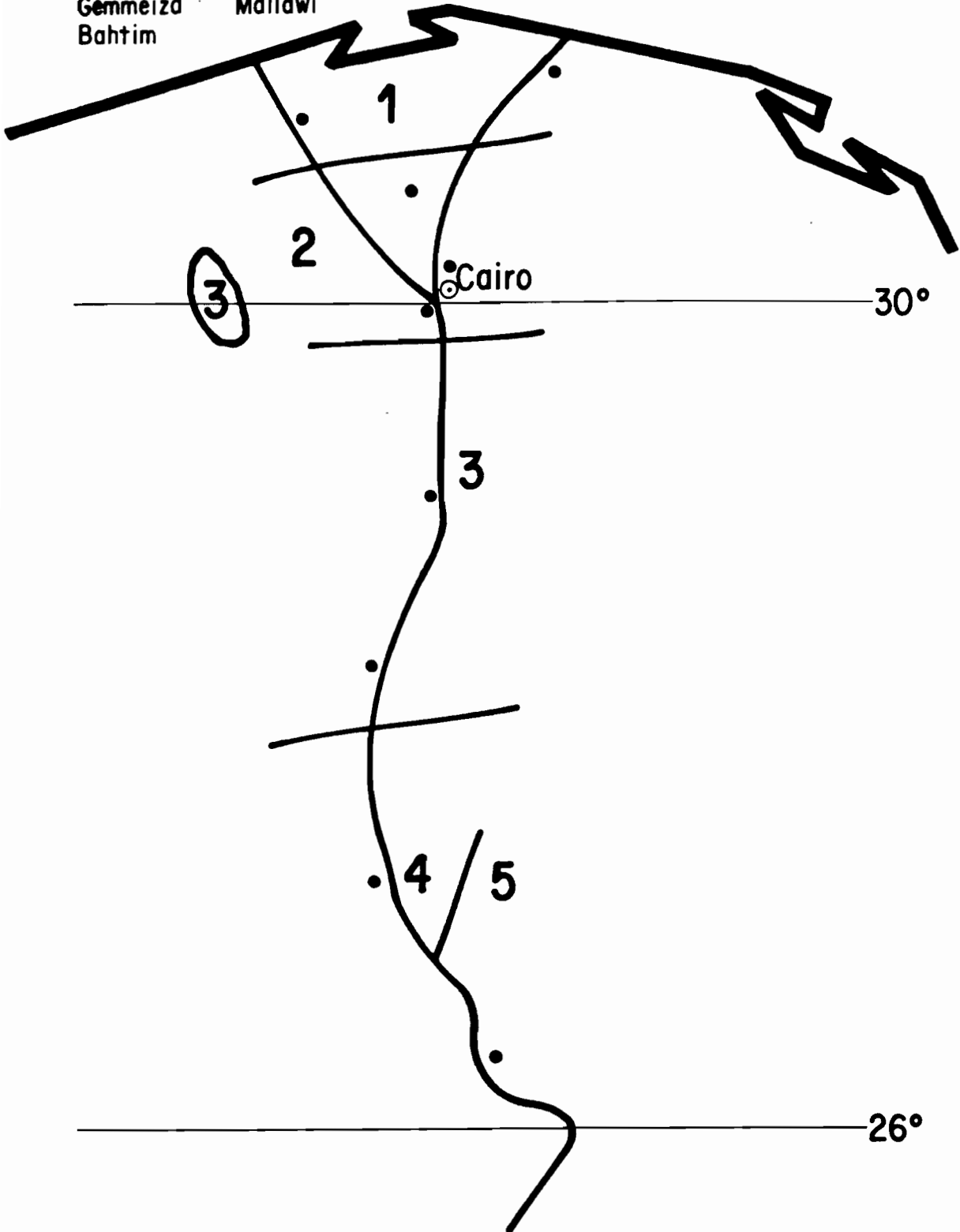
^{ii/}Varieties now I but pursuing E, 14 days earlier in Region 1,2,4,
10 days earlier in Region 3.

Egypt

Serw
Sakha
Gemmeiza
Bahtim

Giza
Sids
Mallawi

Shandaweel
El Mattana



ETHIOPIA I

Region ^{i/}	1	2	3	4	5	6
Type ^{ii/}	SD	SD	SD	SD	SD	SD
Area (1000 ha)	40	10	70	70	60	60
Maturity	E	E	E	I	E	I
Moisture Code	C	C	A	A	A	A
Cold Tolerance						
Drought	Yes	Yes				
Shattering						
Wet					Yes	Yes
Diseases/Insects (% loss):						
Leaf Rust	5	5	5	5	5	6
Stem Rust	2	2	7	7	7	7
Stripe Rust						
Septoria (T)	5	5	3	3		
Fusarium			5	5	5	5
Aphids	1	1				

- ^{i/}Region 1 = 1900-2300 m, Tigrey, Eretrea
 2 = 1500-1900 m, Tigrey, Eretrea
 3 = 1900-2300 m, Shewa, Gojan, Gonder, Heavy Soils
 4 = 1900-2300 m, Shewa, Gojan, Gonder, Light Soils
 5 = 1500-1900 m, Shewa, Gojan, Gonder, Heavy Soils
 6 = 1500-1900 m, Shewa, Gojan, Gonder, Light Soils

ETHIOPIA II

Region i/	7	8	9	10	11
Type ii/	SB	SB	SB	SB	SB
Area (1000 ha)	30	30	70	70	35
Maturity	E	I	E	I	L
Moisture Code	A	A	A	A	A
Cold Tolerance				Yes	Yes
Drought					
Shattering	Yes	Yes			
Wet					
Diseases/Insects (°/o loss):					
Leaf Rust	5	6	6	6	6
Stem Rust					
Stripe Rust	3	3	8	8	8
Septoria (T)	5	5	6	6	6
Fusarium			2	2	2
Aphids					

i/Region 7,8 = 1900-2300 m, Arsi, Shewa, Bale
 9,10,11 = 2300-2700 m, Arsi, Shewa, Bale

ii/Preference in durums is for large, white seed

KENYA

Region ⁱ	1	2	3
Type	SB	SB	SB
Area (1000 ha)	50	20	40
Maturity	E ⁱⁱ	M ⁱⁱ	M
Moisture Code	B	A	B
Acid Soils			Yes
Diseases/Insects (% loss):			
Leaf Rust	3		1
Stripe Rust	6	20	8
Stem Rust	1		1
Helminthosporium (S)	3		8
Septoria (T)		3	10

ⁱ/Region 1 = Lower areas, including Nakuru (2000-2400 m)

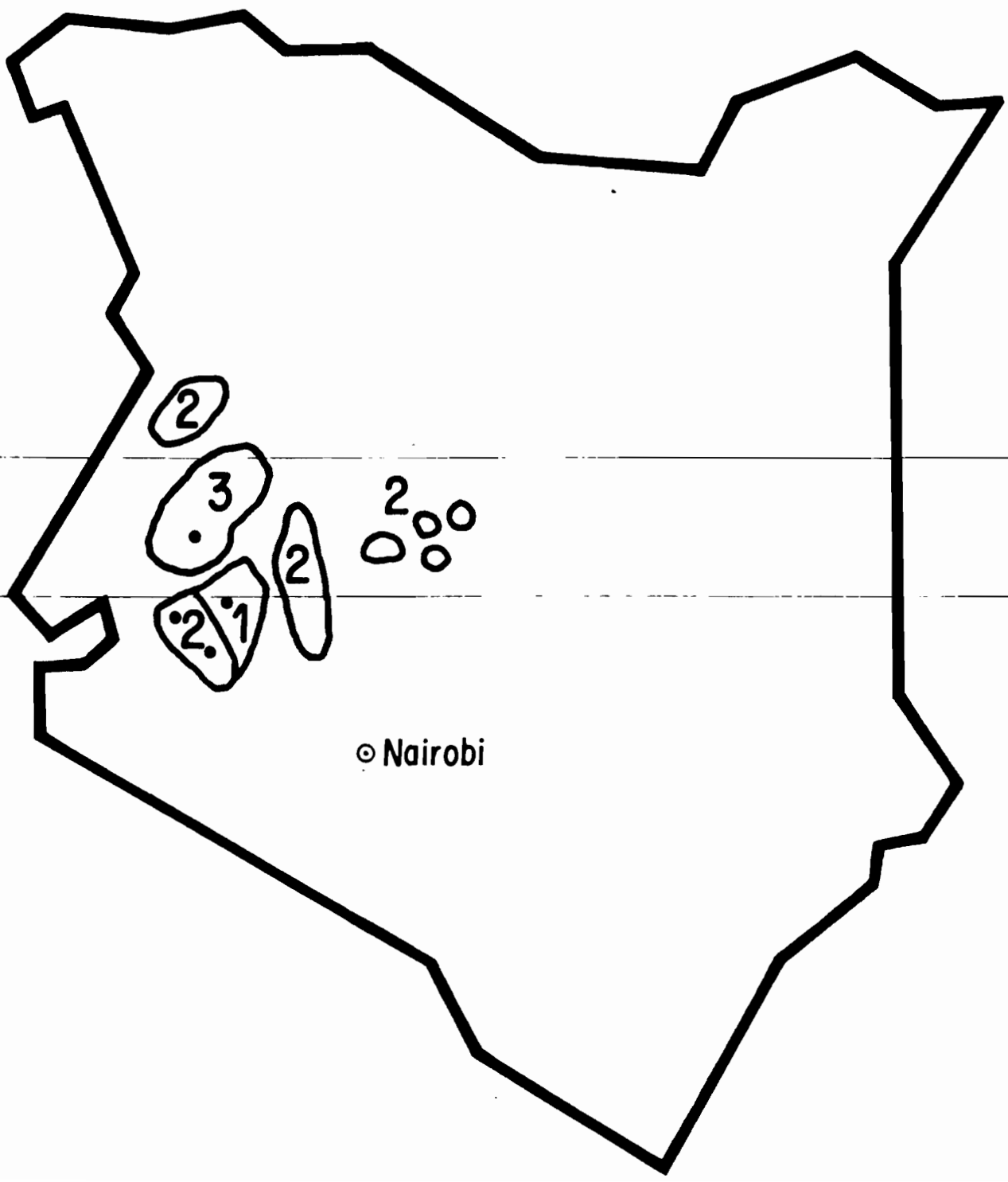
2 = Highest elevations (2400 - 2800 m)

3 = Eldoret area

Kenya

Eldoret
Njoro

Molo
Breweries Exp. Farm



1°

0°

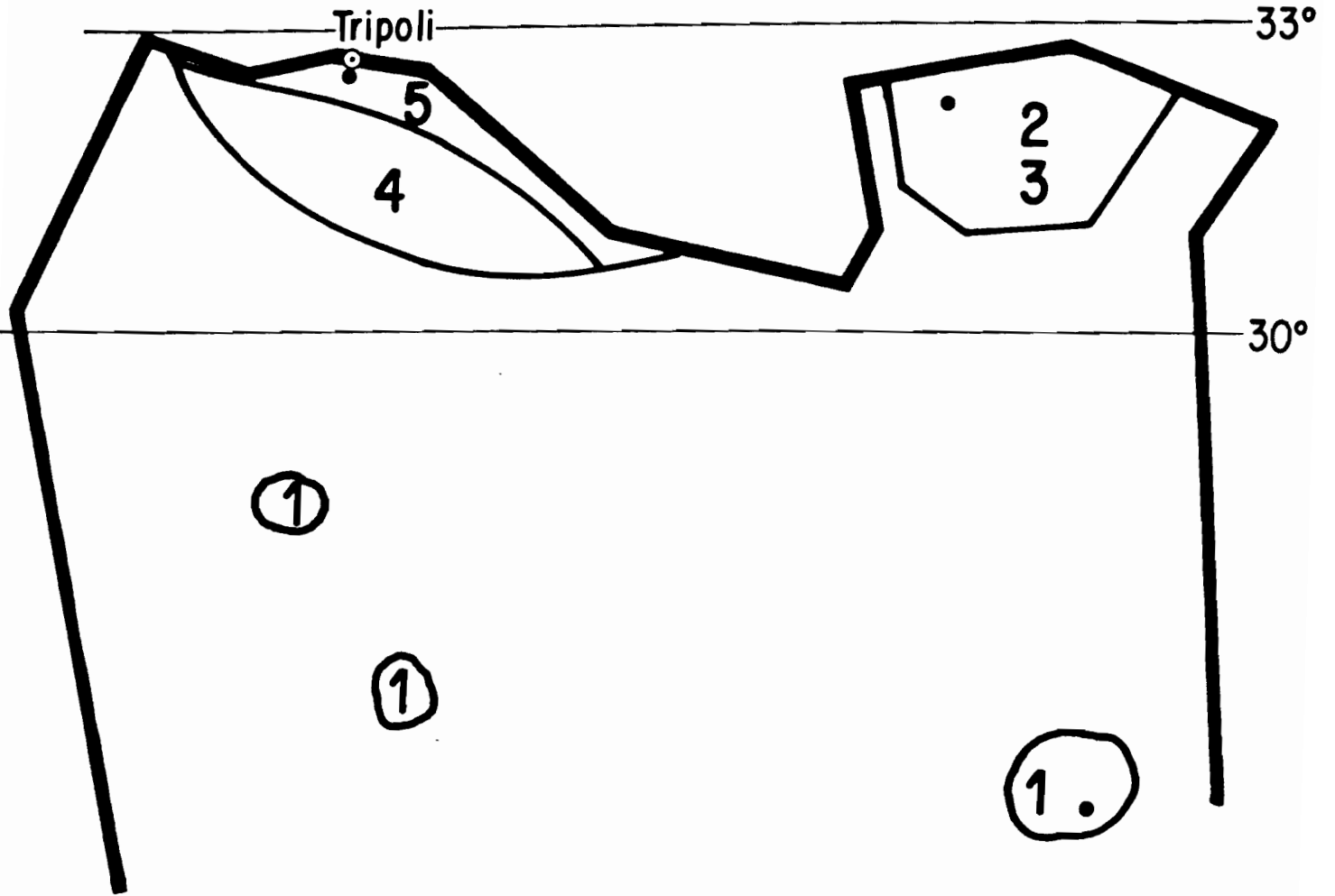
⊙ Nairobi

LIBYA

Region	1	2	3	4	5
Type	SB	SB	SD	SB	SB
Area (1000's ha)	50	10	90	50	50
Maturity	I	I	I	I	I
Moisture Code	A	C	C	D	B
Shattering	Yes				
Salinity					Yes
Diseases/Insects (% loss)					
Leaf Rust		2	2		2
Helmin. Sat.				2	2
Smut (L)	T				
Nematodes				P	

Libya

Sidi Misry
El Marj
Kufra Production Project



MOROCCO I

Region ⁱ	1	2	3	4	5
Type	SD	SD	SD	SD	SD
Area (1000's ha)	35	530	150	350	300
Maturity	I	I	L	I	E
Moisture Code	A	B	C	C	D
Cold Tolerance			Yes		
Heat Tolerance					Yes
Diseases/Insects (% loss):					
Tan spot	6	4	7	4	4
Bunt	3		5	2	
Leaf Rust	9	10	8	8	4
Stripe Rust	T				
Stem Rust	T		2	2	
Septoria ()		8			
Root Rots				9	8
Hessian Fly		9	13	4	9

ⁱ/Region 1, 6 = Oases
 3, 8 = Mountains
 4, 9 = Coastal

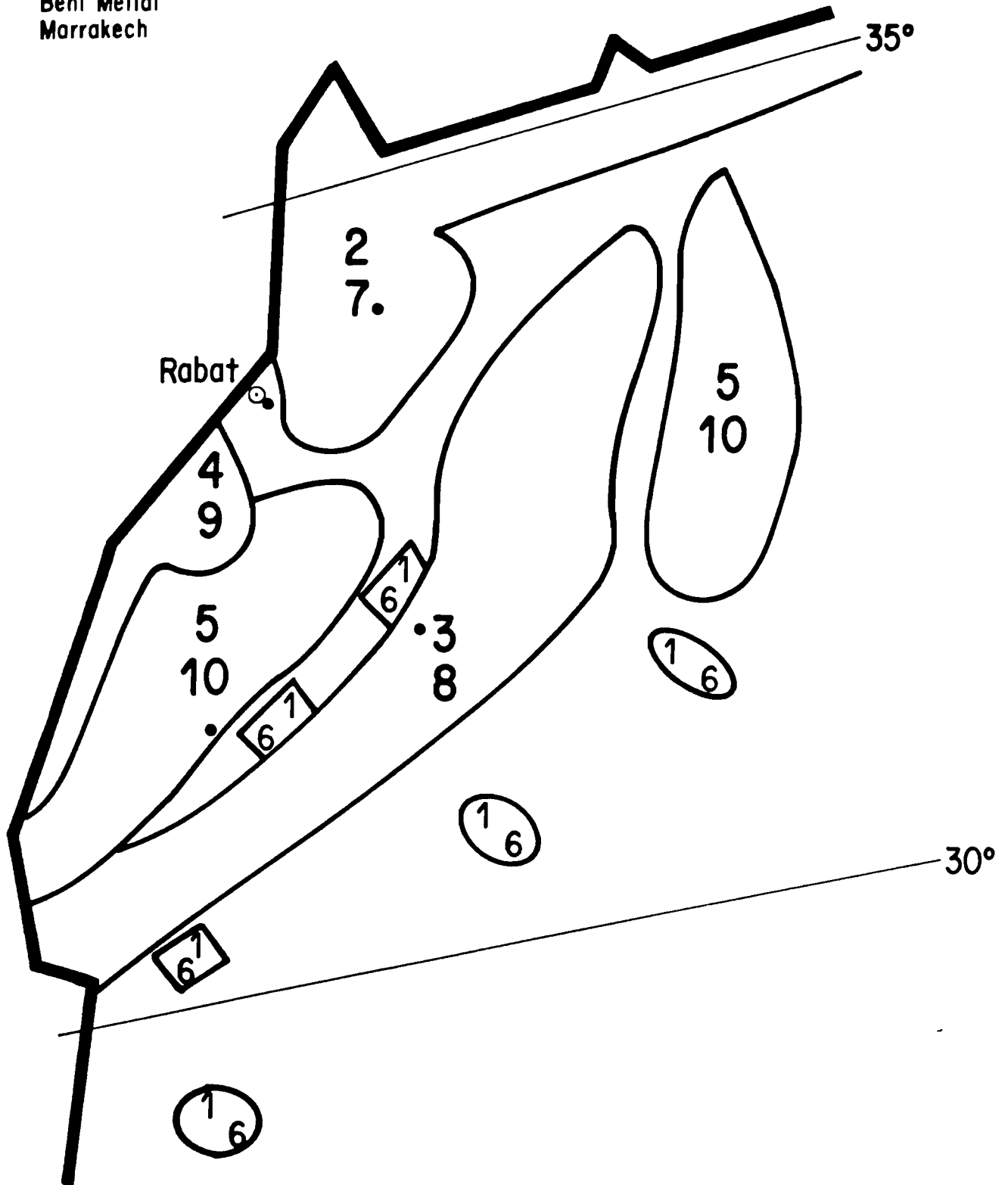
MOROCCO II

Regionⁱ	6	7	8	9	10
Type	SB	SB	SB	SB	SB
Area (1000's ha)	35	250	25	95	180
Maturity	I	I	L	I	E
Moisture Code	A	B	C	C	D
Cold Tolerance			Yes		
Heat Tolerance					Yes
Diseases/Insects:					
Tan Spot	6	4	7	4	4
Bunt	3		5	2	
Leaf Rust	9	10	8	8	4
Stripe Rust	T				
Stem Rust	T		2	2	
Septoria ()		8			
Root Rots				9	8
Hessian Fly		9	13	4	9

^{i/}Regions 1, 6 = Oases
3, 8 = Mountains
4, 9 = Coastal

Morocco

Sidi Kacem
Rabat
Beni Mellal
Marrakech

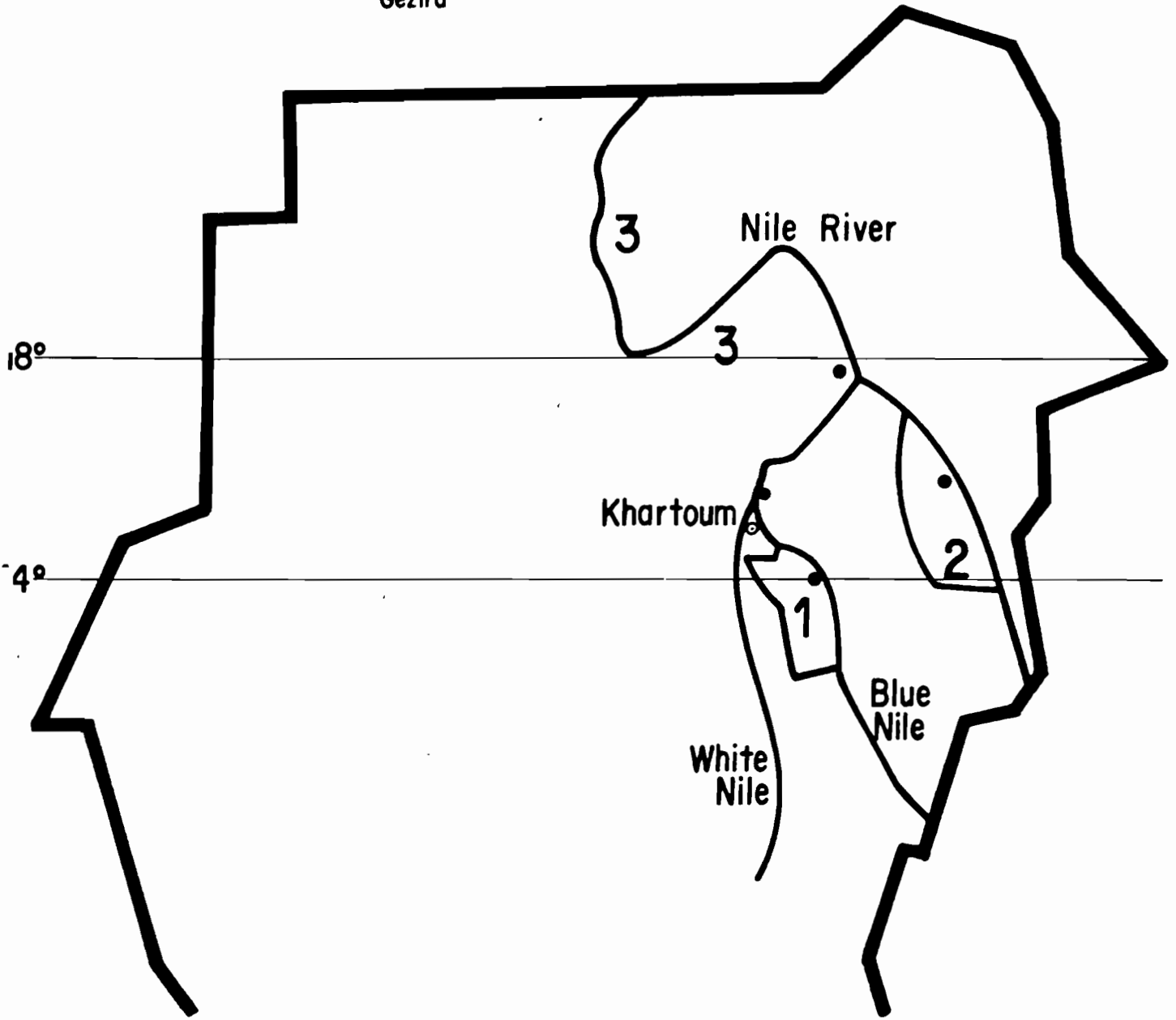


SUDAN

Region	1	2	3
Type	SB	SB	SB
Area (1000's ha)	140	20	10
Maturity	E	E	I
Moisture Code	B	B	A
Shattering	Yes	Yes	
Diseases/Insects (% loss):			
Stem Rust		P	P

Sudan

Hudeiba
New Halfa Exp. Station
Shambat
Gezira

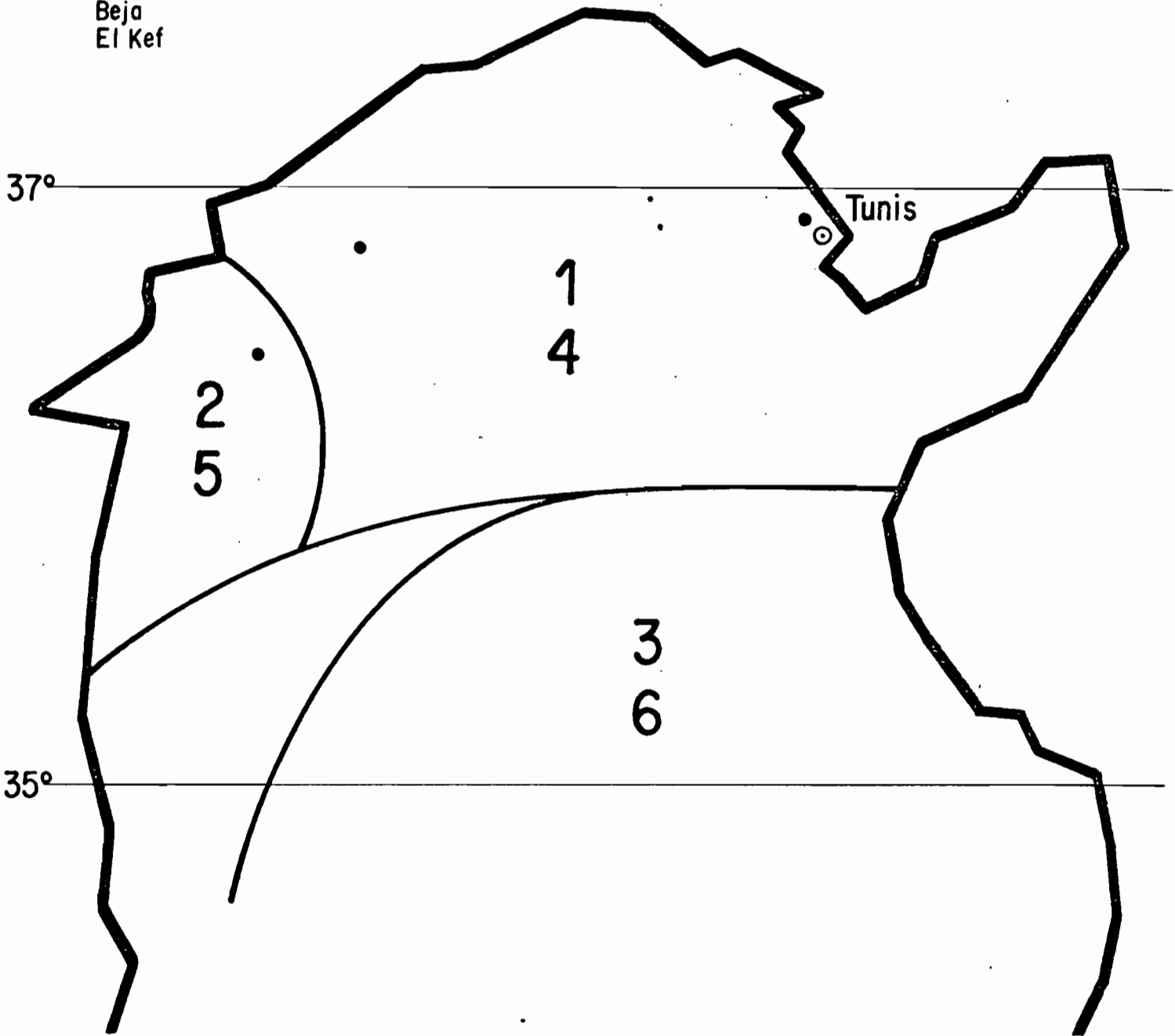


TUNISIA

Region	1	2	3	4	5	6
Type	SD	SD	SD	SB	SB	SB
Area (1000 ha)	410	175	585	100	20	20
Maturity	E	L	E	E	E	E
Moisture Code	B	C	D	B	C	D
Cold Tolerance		Yes			Yes	
Drought			Yes			Yes
Diseases/Insects (% loss):						
Leaf Rust	1	1	1	1	1	1
Stem Rust		T			T	
Stripe Rust	2	2		2	2	
Septoria ()	3			3		
Bunt		1			1	
Smut		T			T	
Root Rot		2	8		2	8
Tan Spot	2	1		2	1	
Hessian Fly			6			6

Tunisia

Tunis
Beja
El Kef

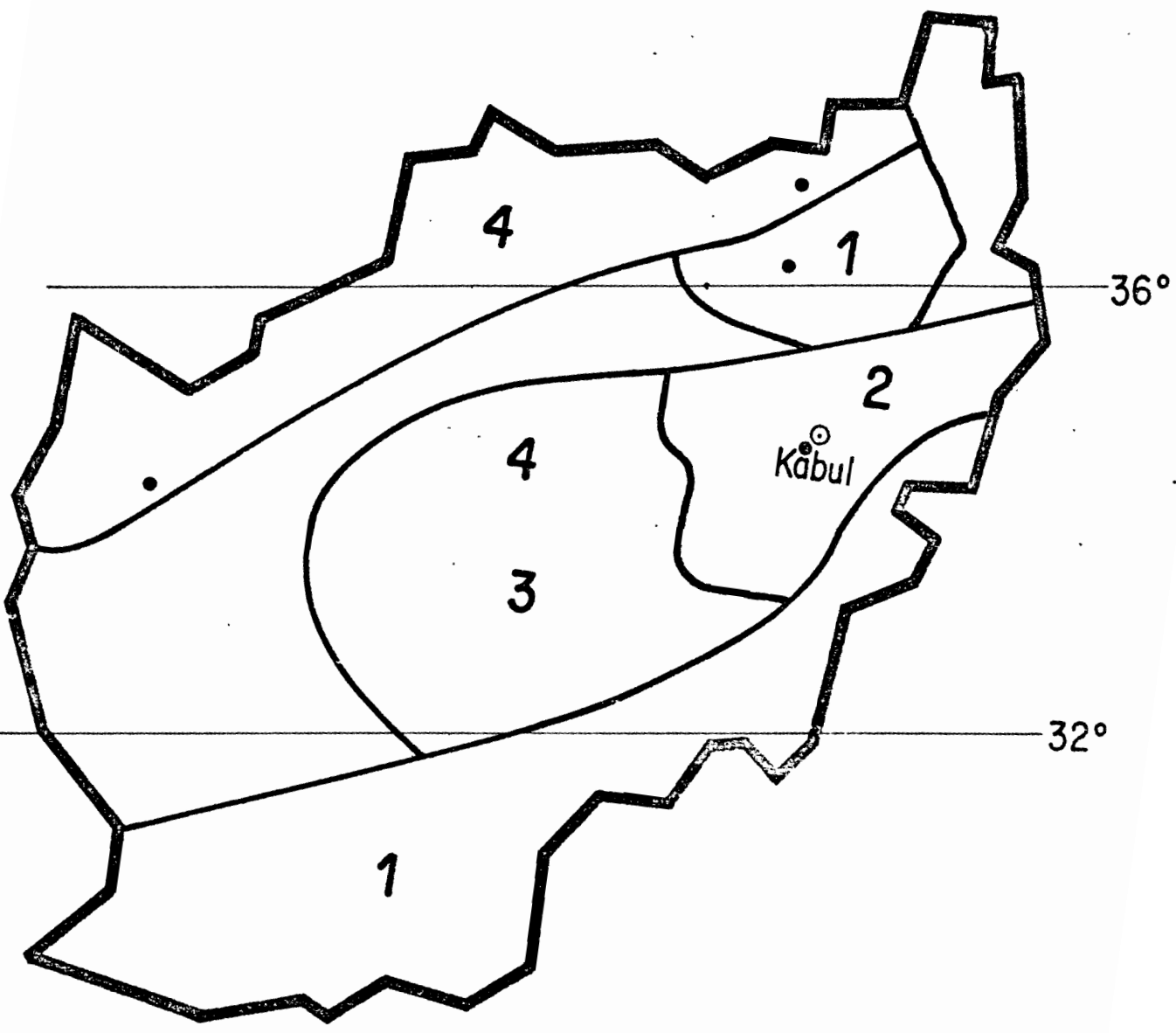


AFGHANISTAN

Region	1	2	3	4
Type	SB	WW	SB	SB
Area (1000's ha)	1,000	200	100	1,000
Maturity	E	I	E	I
Moisture Code	A	B	C	D
Cold		Yes		
Drought				Yes
Diseases/Insects (o/o loss):				
Leaf Rust		5	3	
Stripe Rust	7	8	5	5
Stem Rust	5	3		
Bunt		4	10	

Afghanistan

Qonduz
Baghalan
Kabul
Herat



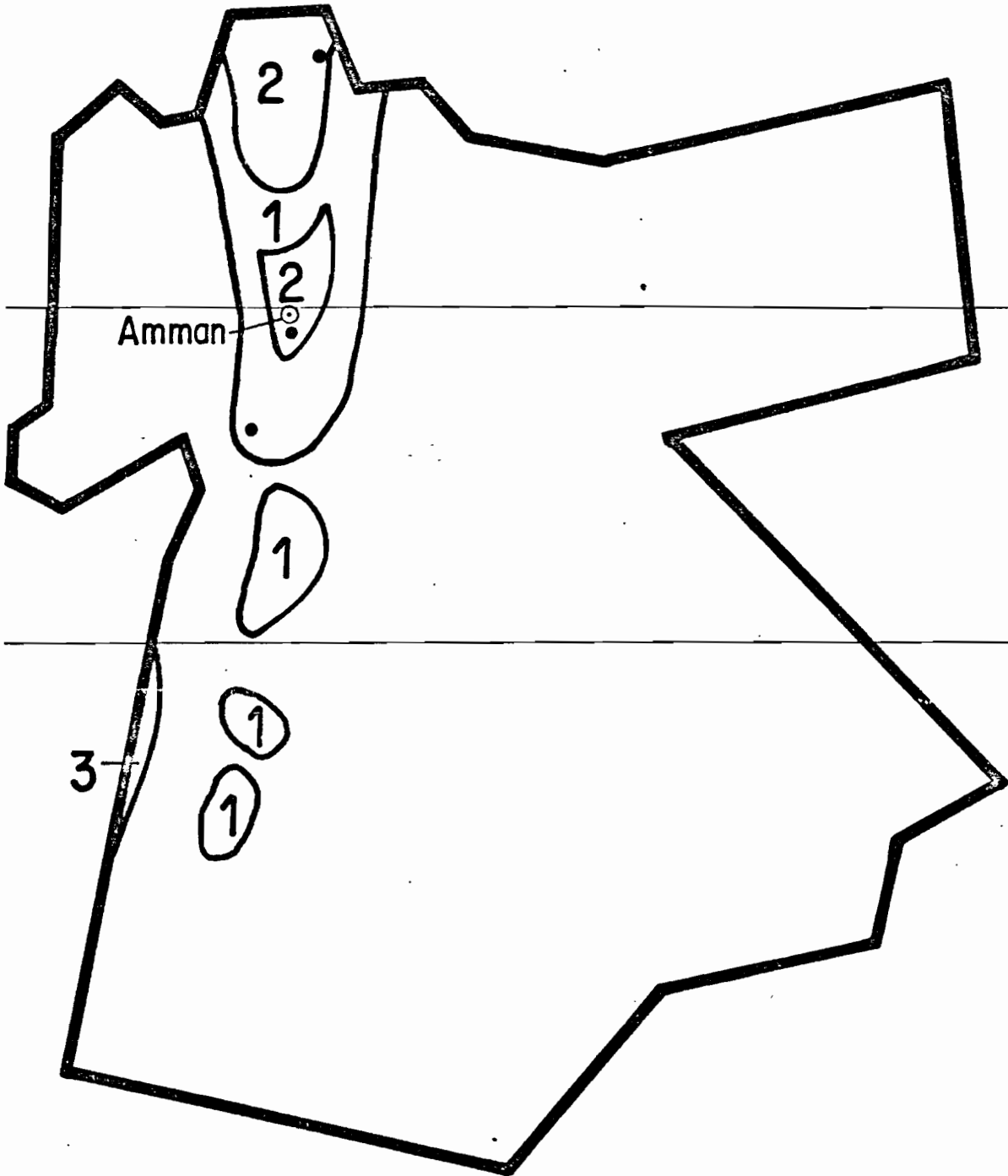
JORDAN

Region	1	2	3
Type	SD	SD	SD
Area (1000's ha)	130	20	5
Maturity	E	E	I
Moisture Code	C	B	A
Diseases/Insects (o/o loss):			
Stripe Rust	2	3	
Septoria (T)		2	

Jordan

Irbid
Jubeiha
Madaba

33° N



32° N

31°

Amman

3

2

1

2

1

1

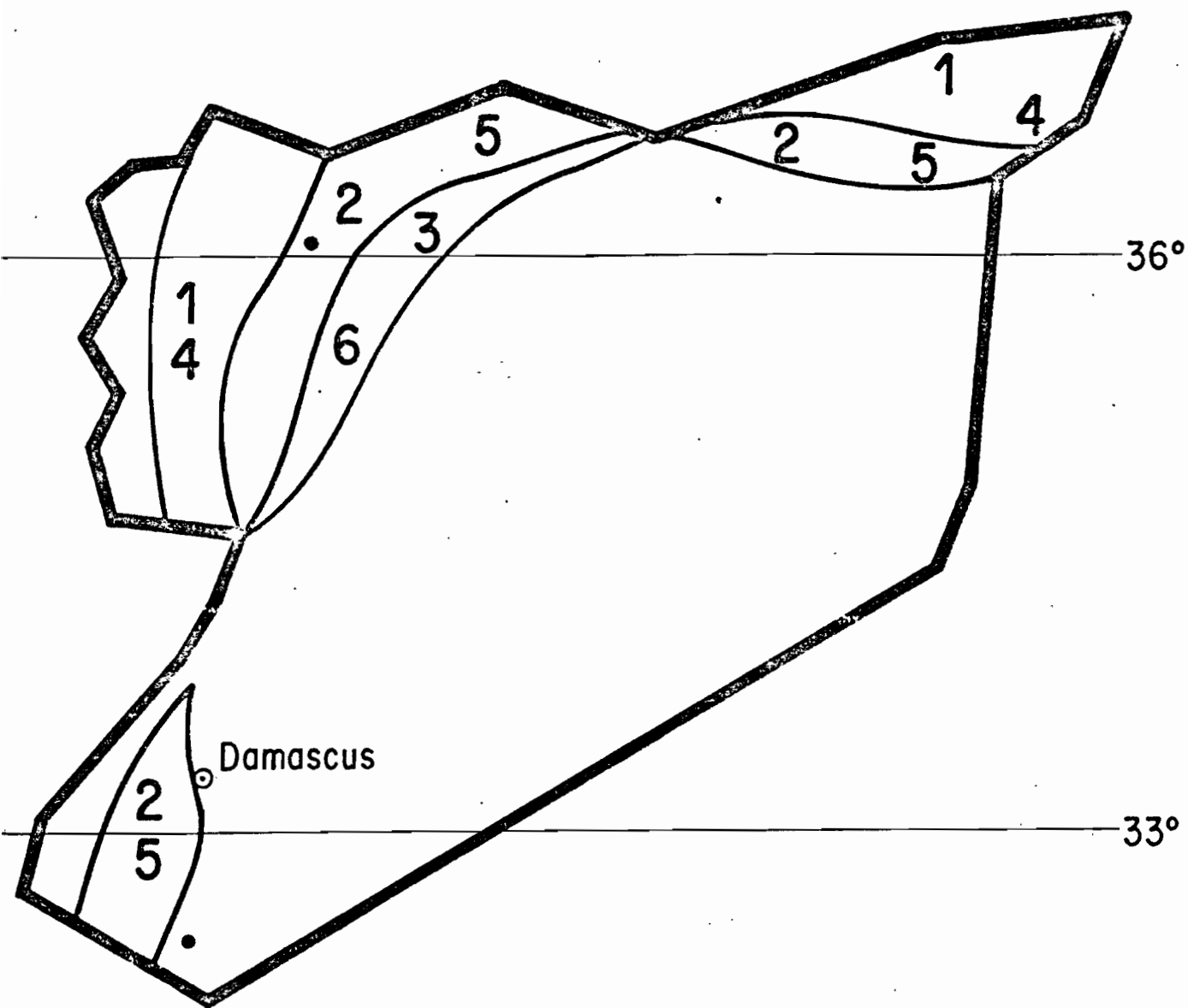
1

SYRIA

Region	1	2	3	4	5	6
Type	SB	SB	SB	SD	SD	SD
Area (1000's ha)	150	350	60	25	140	800
Maturity	I	I	I	I	I	I
Moisture Code	A	B	C	A	B	C
Cold Tolerance		Yes	Yes		Yes	Yes
Drought		Yes				
Shattering	Yes	Yes	Yes			Yes
Diseases/Insects (°/o):						
Stripe Rust	4	2		5	3	3
Septoria (T)	4	3		5	3	
Leaf Rust	T	T				
Bunt		1	3			
Root Rots		3	3			
Ear Cocille		1	1			
Zanthomonas Tr.				4	4	

Syria

Aleppo
Izra



TURKEY I

Region	1A	1B	2A	2B	2C	2D
Type	WW	WD	SB	WW	WD	F
Area (1000's ha)	590	50	85	70	20	85
Maturity	I	E	I	E	E	I
Moisture Code	B	A	A	B	A	A
Yellow Berry		Y				
Diseases/Insects (% loss):						
Stripe Rust	1	1	1	1	5	1
Stem Rust			2	2	1	2
Leaf Rust	2	2	3	3	1	3
Smut (L)				1	1	
Bunt				2	2	
Septoria (T)			1	1	3	1
Root Rots	8	8	3	3		3
Powdery Mildew			2	2		2
BYDV			T			T

TURKEY II

Region	3A	3B	3C	3D	4A	4B	4C	4D
Type	SB	SD	WW	WD	SB	SD	WW	WD
Area (1000's ha)	160	160	20	75	110	75	110	700
Maturity	I	I	E	I	I	I	I	E
Moisture Code	B	B	B	A	B	B	B	B
Disease/insects (% loss):								
Stripe Rust	5	5	5					10
Stem Rust	1	1	1	10	10	10	2	2
Leaf Rust	1	1	1	1	1	1	1	2
Smut (L)	1	1					1	1
Bunt	2	2						
Septoria (T)	3	3	3		1			
Root Rots				1	1		1	

TURKEY III

Region	5A	5B	6	7A	7B
Type	WW	WD	WW	SB	SD
Area (1000's ha)	460	510	2870	715	95
Maturity	I	E	E	I	I
Moisture Code	C	D	D	B	B
Cold Tolerance				Y	Y
Yellow Berry ⁱ				Y	Y
Salinity		Y	Y ⁱ		
Diseases/Insects (% loss):					
Stripe Rust	10	10	10	1	1
Stem Rust	3	3		2	2
Leaf Rust	2			10	10
Smut (L)	4	4			
Septoria (T)					4
Root Rots				4	

ⁱ/A serious problem in wheat.

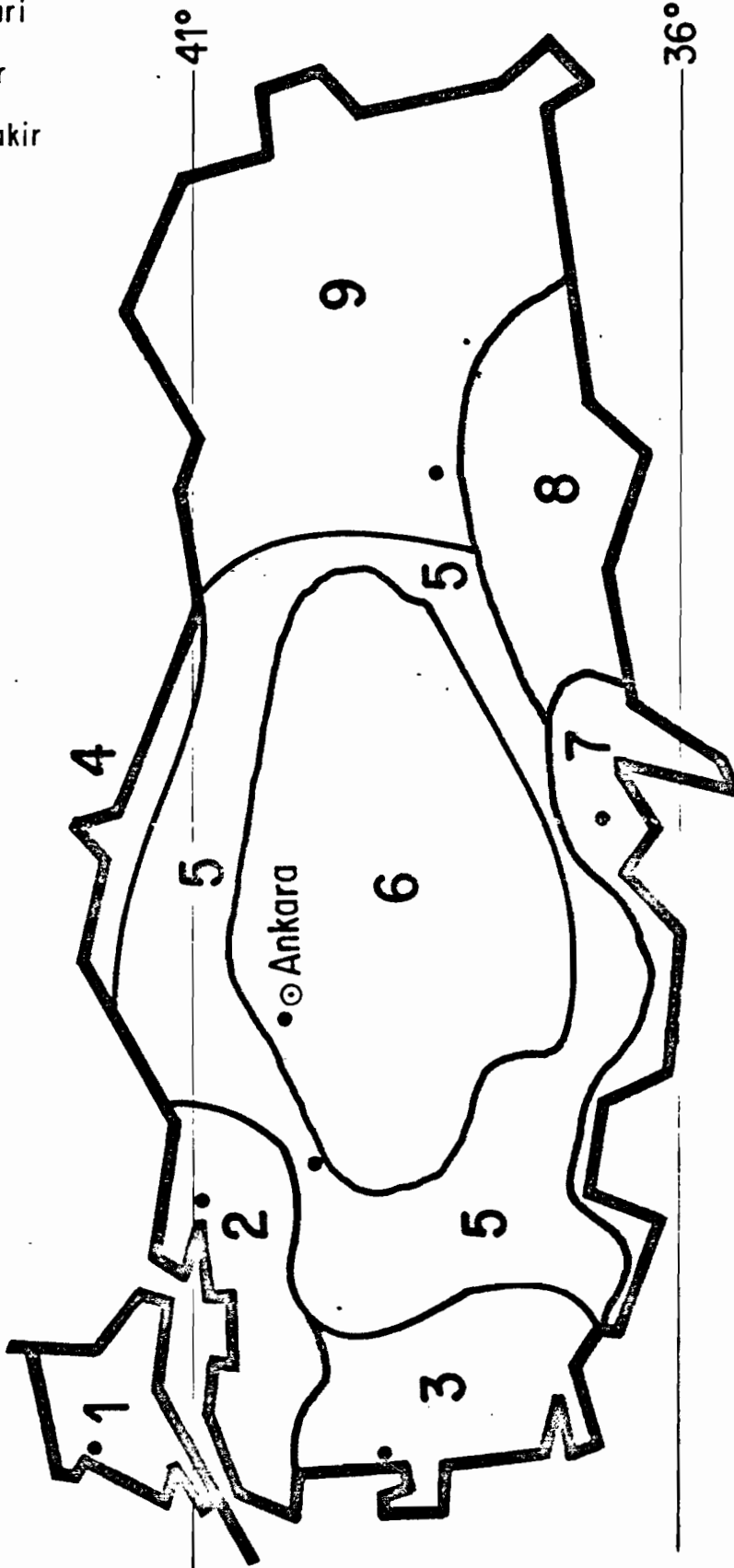
TURKEY IV

Region	8A	8B	9A	9B	10
Type	SB	SD	SB	F	WW
Area (1000's ha)	370	850	290	380	290
Maturity	E	E	E	E	E
Moisture Code	D	D	D	D	D
Cold Tolerance	Y	Y	Y		
Yellow Berry ⁱ	Y	Y			
Diseases/Insects (% loss):					
Stripe Rust			?	1	1
Leaf Rust			?		
Bunt	10	10	?	15	15

ⁱ/A serious problem in wheat.

Turkey

Edirne
Adapazari
Ankara
Eskishir
Ismir
Diyarbakir
Adana

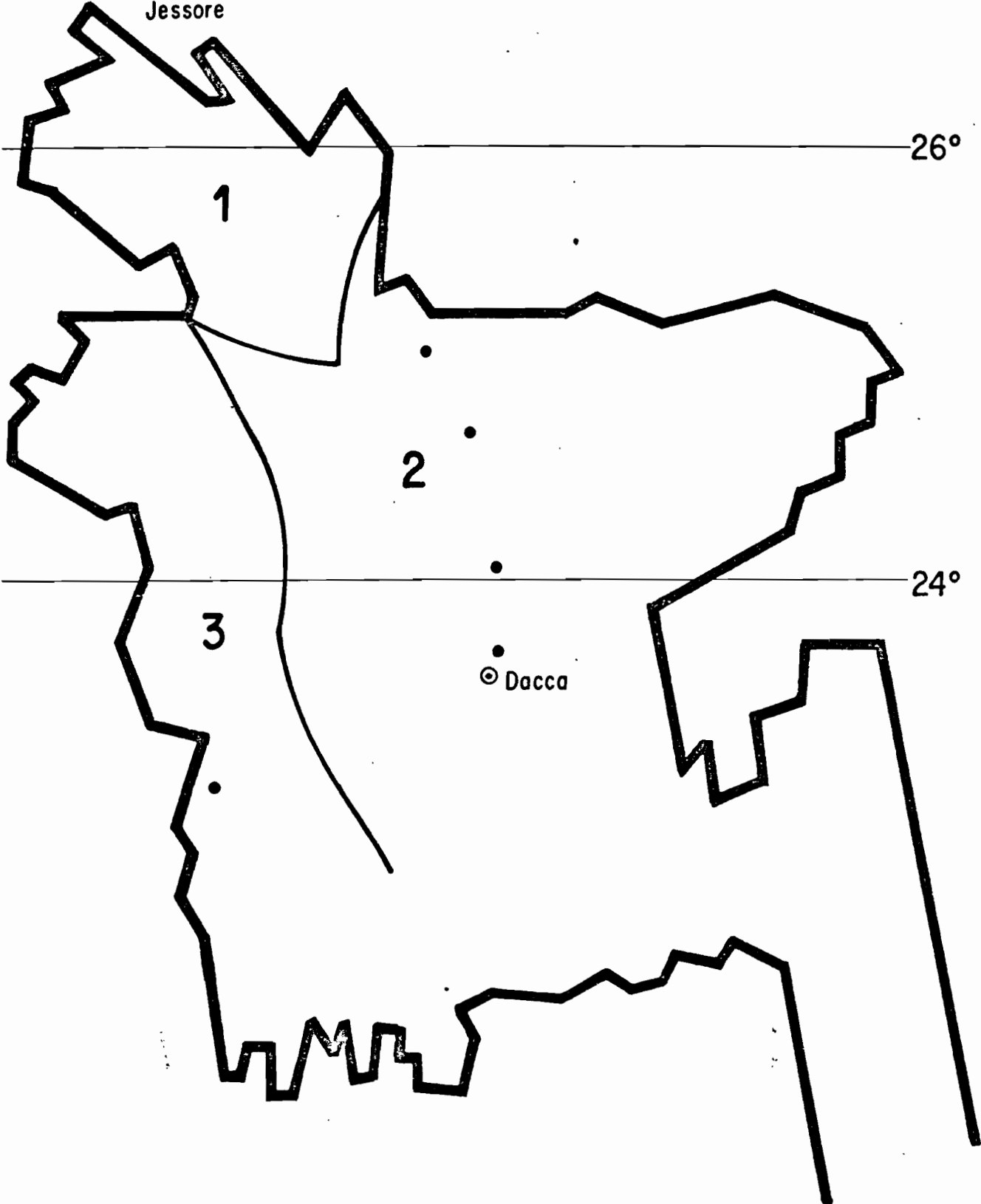


BANGLADESH

Region	1	2	3
Type	SB	SB	SB
Area (1000's ha)	175	325	195
Maturity	E	E	E
Moisture Code	A	B	C
Heat Tolerance	Yes	Yes	Yes
Sterility Florets	Yes	Yes	Yes
Diseases/Insects (°/o loss):			
Leaf Rust	2	2	2
Helminthosporium S.	6	6	6
Smut (L)	T	T	T
Sclerotium	T	T	T

Bangladesh

Jamalpur
Mymensing
Joydebpur
Dacca
Jessore



CHINA I

NORTHERN WINTER AREA

Region	1EA	1EB	1MA	1MB	1W
Type	WW	WW	WW	WW	WW
Area (1000 ha)	400	1,210	100	210	640
Maturity	ML	ML	ML	ML	L
Moisture Code	C	A/B	C	A/B	B/C
Cold Tolerance	Y	Y	Y	Y	Y
Heat Tolerance	Y		Y	Y	Y
Sprouting	Y	Y	Y	Y	
Drought			Y		Y
Lodging		Y		Y	
Diseases/Insects (% loss):					
Leaf Rust	P	P	P	P	
Stripe Rust	P	P	P(1)	P(1)	P(1)
Powdery Mildew		P		P(2)	
BYDV	P	P	P(2)	P(3)	P(2)
Rosette	P	P	P	P	P(3)
Aphids	P	P	P	P	P
Mites			P		P

Soil Insects and Army Worms are common in entire area.
E = East, M = Middle, W = West.

CHINA II

Huang/Huai Plain - Eastern Area

Region	2S1	2S2	2M3	2M4	2N5	2N6
Type	SB	SB	F	F	WW	WW
Area (1000 ha)	4,500	500	3,170	500	1,000	1,500
Maturity	I	I	I	I	I	I
Moisture Code	A	C	A	C	A	C
Alkalinity	Y	Y	Y	Y	Y	Y
Cold Tolerance	Y	Y				
Diseases/Insects (% loss):						
Stripe Rust	P(1)	P	P(1)	P	P(1)	P
Leaf Rust	I(3)	P(1)	I(3)	P(1)	I(3)	P(1)
Powdery Mildew	I(2)		I(2)		I(2)	
BYDV	P	P(2)	P	P(2)	P	P(2)
Soil Borne Mosaic	P		P		P	
Aphids	P	P	P	P	P	P

Soil insects and army worms are present in all regions. Stem rust is found only in coastal portions. Other foliar diseases are found in 2S1, 2M3, 2N5.

S = South, M = Middle, N = North

CHINA III

Huang-Huai Plain-Western Area

Region	2W7	2W8	2W9	2W10
Type	F	WW	SB	F
Area (1000's ha)	780	210	520	490
Maturity	I	I	I	I
Moisture Code	A/B	C	A/B	C
Diseases/Insects (% loss):				
Stripe Rust	3	P(1)	3	P(1)
Leaf Rust	1		1	
Powdery Mildew	1		1	
BYDV	P	P(2)	P	P(2)
Fusarium Scab	P		P	
Aphids	P	P	P	P

Soil insects and army worms are present in all regions. Other foliar diseases are also found in 2W7 and 2W9.

W = West

CHINA IV

Middle - Lower Yangtze

Region	3H1	3H2	3H3	3H4	3Y5	3M6
Type	SB*	SB*	F	F	SB	SB
Area (1000 ha)	455	195	925	395	1030	340
Maturity	ME	ME	I	I	E	E
Moisture Code	A/B	A/B	A/B	A/B	A	A
Lodging	Y	Y	Y	Y	Y	Y
Wet Soil					Y	Y
Sprouting	Y	Y	Y	Y	Y	Y
Diseases/Insects (% loss):						
Leaf Rust	3	3	3	3	1	P(2)
Fusarium Scab	2	2	2	2	8	10
Powdery Mildew	2	2	2	2	2	P(3)
Rhizutonia Sp	P	P	P	P	P	P
Stripe Rust	I	I	I	I	P	P
Stem Rust	P	P	P	P	P	P
Aphids	P	P	P	P	P	P

Stem rust is found mostly along coast, Army worms are present throughout the area.
 SB is fall planted. H = Huai Valley, Y = Yangtze Valley, M = Mountains.

CHINA V

Region	Southwestern		South		Northeastern		
	4S1	4P2	5C1	5M2	6W1	6N2	6E3
Type	SB	SB	SB	SB	SB	SB	SB
Area (1000 ha)	2,590	1,000	270	330	500	850	910
Maturity	E	E	E	E	ML	ML	ML
Moisture Code	A	A	A	A	C	B	A
Cold Tolerance						Y	
Drought					Y		
Heat Tolerance							
Lodging	Y	Y	Y	Y			Y
Sprouting	Y	Y	Y	Y		Y	Y
Wet Soil			Y	Y			
Diseases/Insects (% loss):							
Stripe Rust	2	2	P	P			
Leaf Rust	P(3)	P(3)	2	P(3)	P	P(3)	P(4)
Powdery Mildew	P(2)	P(2)	2	P(2)		P(4)	P(5)
Stem Rust			1		P	P(2)	P(3)
Fusarium Scab	P		4	P(1)			8
H. Leaf Blight			P	P			
Root Rot					P	6	6
BYDV					2	P	
Rosette					P		
Loose Smut					T	T	T
Aphids	P	P	P	P	P	P	

S = Sichuan Basin, P = Plateau, C = Coastal, M = Mountains, W = West, N = North, E = East.

Southwestern and South is fall sown.

CHINA VI

Region	Northern			Northwest				
	7H1	7P2	8R1	8M2	8M3	8M4	8N5	8N6
Type	SB	SB	SB	SB	WW	SB	SB	WW
Area (1000 ha)	90	650	230	400	40	280	290	30
Maturity	L	ME	I	I	I	I	I	I
Moisture Code	C	B	A/B	C	C	A/B	A/B	A/B
Heat Tolerance		Y	Y	Y	Y		Y	Y
Sprouting		Y				Y		
Cold Tolerance	Y							
Shattering							Y	Y
Alkalinity			Y				Y	Y
Drought	Y			Y	Y			
Diseases/Insects (% loss):								
Stripe Rust			P(1)			P(1)		
Root Rot			P				P	P
Stem Rust		I	P(2)			P		
Leaf Rust		P(2)	P(3)			P		
Powdery Mildew			P			P(2)		
BYDV		P(3)	P	P	P		P	P
Loose Smut	P	P	T	P	P	T	P	P
Aphids			P	P	P		P	P

Stem magoos affect 7. For 8R1 Stripe Rust is most important in south, stem and leaf rust in north, alkalinity is more important in north.

H = High lands, P = Plains; R = Riverside, M = Mountains, N = Northwest.

CHINA VII

Region	Qing-zang Plateau			Xinjiang			
	9C1	9T2	9T3	10N1	10N2	10S3	10S4
Type	SB	SB	WW	SB	WW	SB	WW
Area (1000 ha)	40	80	20	370	370	140	420
Maturity	I	ML	L	L	L	ML	ML
Moisture Code	A/B	A/B	A/B	A/B	A/B	A/B	A/B
Alkalinity	Y			Y	Y	Y	Y
Cold Tolerance	Y	Y	Y		Y		
Early Frost	Y						
Heat Tolerance				Y	Y	Y	Y
Diseases/Insects (% loss):							
Stem Rust	P	P	P				
Stripe Rust	P(1)	P(1)	P(1)	P(1)	P(1)	P	P
Bunt	P	P	P	P	P	P	P
Selenophoma Sp		P	P				
Loose Smut	P	P	P	P	P	P	P
Leaf Rust				P	P	P	P
Snow Mold					P(2)		
BYDV				P	P	P	P
Rosette				P	P	P	P
Aphids				P	P	P	P

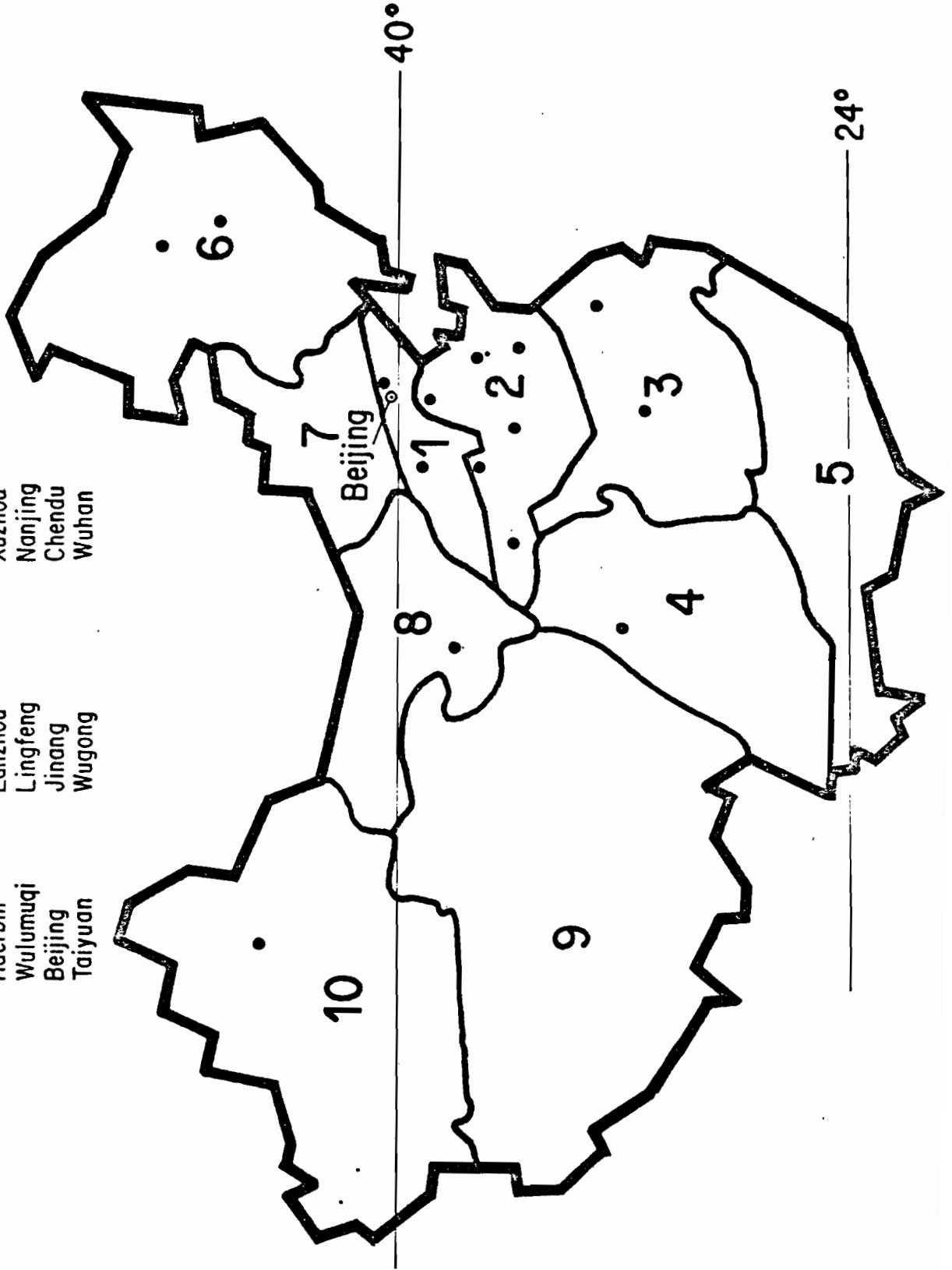
C = Chinghai, T = Tibet; N = North, S = South.

China

Keshan
Haerbin
Wulumuqi
Beijing
Taiyuan

Shijiazhiang
Lanzhou
Lingfeng
Jinang
Wugong

Zhengzhou
Xuzhou
Nanjing
Chendu
Wuhan



INDIA I

Region	1	2A	2Bⁱ	2C	3A	3Bⁱ
Type	SB	SB	SB	SB	SB	SB
Area (1000's ha)	900	2,000	4,300	700	1,150	950
Maturity	L	ML	E	ML	ML	E
Moisture Code	A	A	A	B	B	B
Cold Tolerance	Y					
Drought						
Frost					Y	Y
Heat						
Diseases/Insects (°/o loss):						
Leaf Rust	4	5	5	5	5	5
Stripe Rust	5	3	3	3		
Flag Smut					T	T
Powdery Mildew	2	T				
Hill Bunt	2					
Loose Smut	5	5	5	5	5	5
Karnal Bunt		1	1	1		
Nematode					1	1
Leaf Blight						

^{i/} E = After rice in 2B, after cotton in 3B.

INDIA II

Region	4A	4B	4C	4D	5A	5B
Type	SB	SB	SB	SB	SB	SB
Area (1000's ha)	3,500	850	1,500	350	150	250
Maturity	E	I	E	I	E	E
Moisture Code	A	A	C	C	A	B
Salinity	Y	Y				
Shattering						
Diseases/Insects (°/o loss):						
Leaf Rust	6	6	6	6	6	6
Stem Rust					3	3
Losse Smut	4	4	4	4	4	4
Leaf Blight	5	5	5	5	8	8

INDIA III

Region	6A	6B	6C	6D
Type	SB	SD	SB	SD
Area (1000's ha)	1,000	100	2,550	650
Maturity	ME	I	I	I
Moisture Code	B	B	D	D
Drought			Y	Y
Shattering			Y	
Diseases/Insects (°/o loss):				
Stem Rust	2	2	2	2
Alternaria	1	1	2	2
Leaf Rust	3	1	1	1

INDIA IV

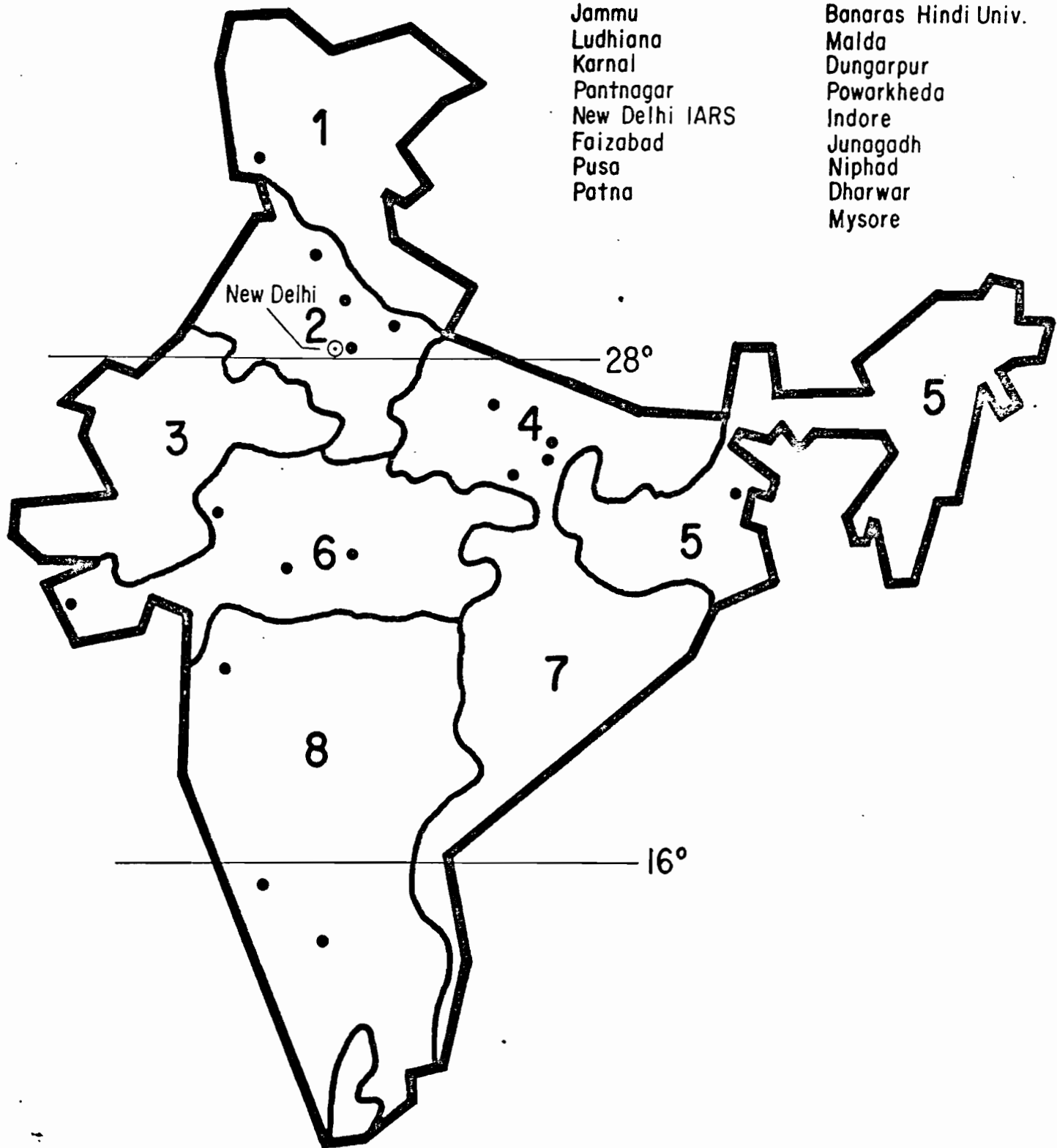
Region	7A	7B	8A	8B
Type	SB	SB	SB	SD
Area (1000's ha)	200	200	550	850
Maturity	E	E	E	E
Moisture Code	B	D	B	D
Drought			Y	Y
Heat	Y	Y	Y	Y
Diseases/Insects (% loss):				
Stem Rust	4	4	6	6
Leaf Rust	3	3	4	4
Leaf Blight	3	3	2	2
Root Rot			4	4
Loose Smut	2	2		

India

36°

Jammu
Ludhiana
Karnal
Pantnagar
New Delhi IARS
Faizabad
Pusa
Patna

Banaras Hindi Univ.
Malda
Dungarpur
Powarkheda
Indore
Junagadh
Niphad
Dharwar
Mysore



New Delhi

28°

16°

NEPAL I

Region	TARAI AREA ⁱ						
	1	2	3	4	5	6	7
Type	SB	SB	SB	SB	SB	SB	SB
Area (1000's ha)	15	25	45	50	150	15	65
Maturity	E/I	E/I	E/I	E/I	E/I	E/I	E/I
Moisture Code	B	C	A	B	C	B	C
Heat tolerance (L)	Y	Y	Y	Y	Y	Y	Y
Sprouting	Y	Y	Y	Y	Y		
Sterility	Y		Y				
Diseases (Scale)							
Helminthosporium	P(1)	P(1)	P(1)	P(1)	P(1)	P(1)	P(1)
Loose Smut	P(3)	P(3)	P(3)	P(3)	P(3)	P(2)	P(2)
Leaf Rust	P(2)	P(2)	P(2)	P(2)	P(2)	T	T
Powdery Mildew			T	T	T	P(3)	P(3)

^{i/} In the Tarai, most wheat is grown after rice and variety grown depends on maturity of preceding rice, late rice implies Early wheat.

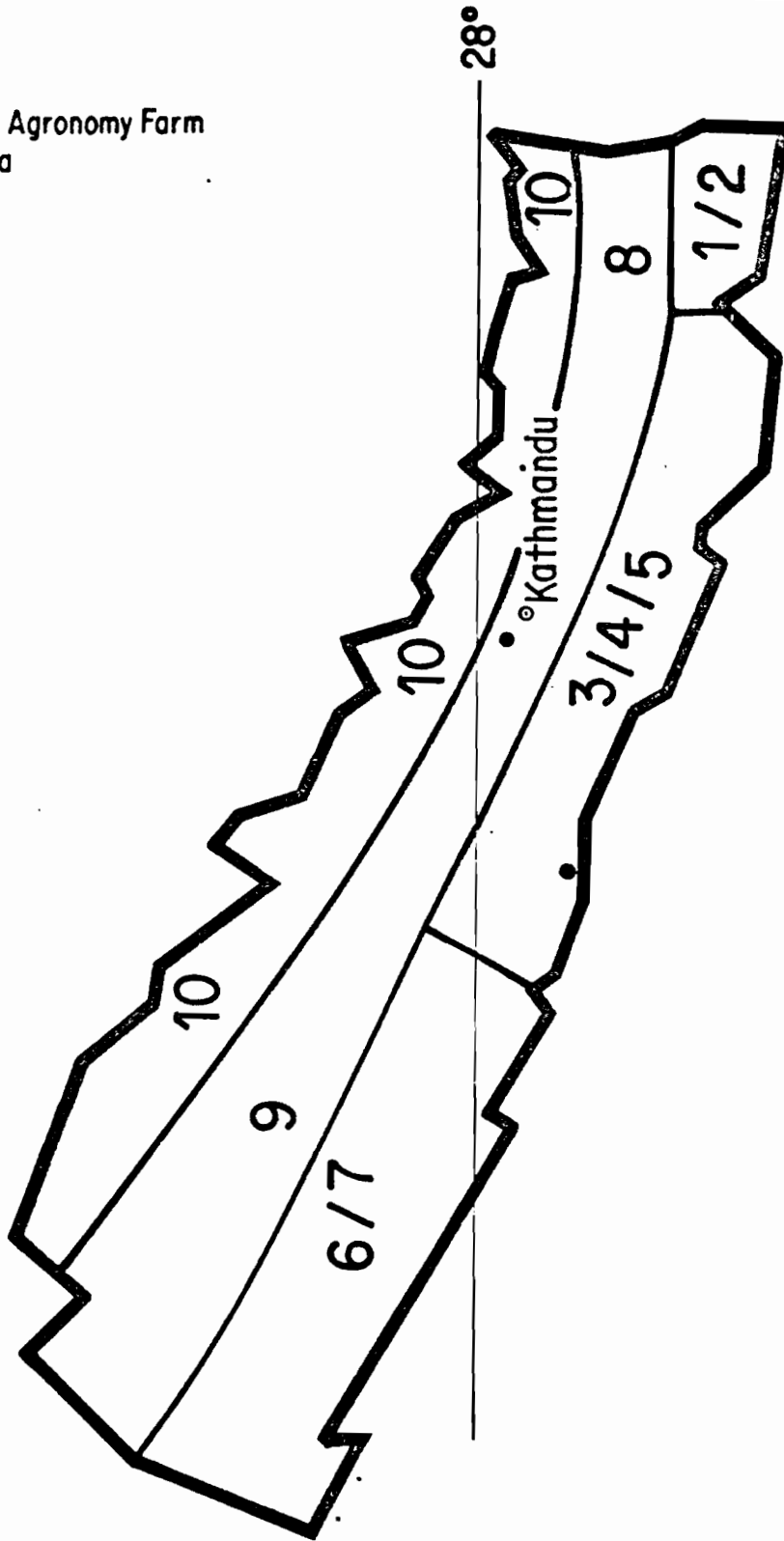
NEPAL II

Region	HILL AREA		MOUNTAINS
	8	9	10
Type	SB	SB	WW/F
Area (1000's/ha)	60	40	10
Maturity	E	E	I/ML
Moisture Code	C	C	B
Sterility	T ⁱ	T ⁱ	
Diseases (Scale)			
Helminthosporium	P(4)	P(3)	
Loose Smut	P(1)	P(2)	
Leaf Rust	P(3)	T	
Stripe Rust	P(2)	P(1)	
Powdery Mildew		T	

i/ Sterility in some areas, probably a different cause than in Region I.

Nepal

Khumaltar Agronomy Farm
Bhairahawa



PAKISTAN I

Region	1	2	3	4A	4B
Type	SB	SB	SB	SB	SB
Area (1000's ha)	80	70	300	2,000	1,000
Maturity	L,E ⁱ	L,E ⁱ	I	E	I
Moisture Code	D	D	B	B	B
Cold Tolerance	Yes ⁱ	Yes ⁱ			
Drought	Yes	Yes ⁱ			
Heat Tolerance	Yes ⁱ	Yes	Yes	Yes	
Salinity			Yes	Yes	Yes
Shattering ⁱⁱ	Yes	Yes	Yes	Yes	Yes
Diseases/Insects (% loss):					
Leaf Rust	3	2	2	2	2
Stripe Rust	5				
Stem Rust	P	P	P	P	P
Bunt	T	P			
Flag Smut	T	P	P	P	P
Powdery Mildew					
Fusarium					

ⁱ/L = Late and cold tolerance but E if rains late with heat tolerance during maturity.

ⁱⁱ/Because of late harvesting.

PAKISTAN II

Region	5A	5B	6	7	8
Type	SB	SB	SB	SB	SB
Area (1000's ha)	1,000	1,300	750	750	250
Maturity	E	I	L	I	I
Moisture Code	B	B	D	C	B
Cold Tolerance					Yes
Drought			Yes		
Heat Tolerance	Yes		Yes		
Salinity	Yes	Yes			
Shattering ^{i/}	Yes	Yes	Yes	Yes	Yes
Diseases/Insects (% loss):					
Leaf Rust	3	3	3	3	2
Stripe Rust	4	4		3	3
Stem Rust	P	P	P	P	P
Bunt	P	P			
Flag Smut	P	P		P	T
Powdery Mildew	1	1			2
Fusarium				?	

^{i/}Because of late harvesting.

Pakistan

Peshawar
Islamabad
Faisalabad
Quetta
Bahawalpur
Tandojam

